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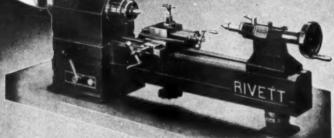
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### HITCHCOCK'S

# MACHINE TOOL BLUE BOOK

OVER 30,000 THIS ISSUE

OCTOBER 1940

**VOLUME 35, No. 10** 

### CCA

### THIS MONTH

Training Youth for Industry	
By Frederick E. Searle	25
If Bulky Tools Buck Profits	
By H. J. Chamberland	33
Increasing Production	46
Flexible Shaft Versatility	
By Carleton Cleveland	55
Milling Performance	
By M. R. Crossman	65
Punching Irregular Shapes	
By J. A. Smith	73
Carbide Tooling for Older Equipment	
By James R. Longwell	77
Broaching Bourrelet Grooves in 81 mm. Shells	81
Individual Drives	
By Francis A. Westbrook	85
Expanding Use of Carbides	89
Hard Facings and Overlays	93
The Editor's Page	23
What's New in The Industry	95
Mechanics Through the Ages	188
New Trade Literature	219
Latest Equipment Catalog	217
	220
Index to Advertisers 256.5	

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REPRESENTATIVES: New England-Warren E. Hoffman, 269 S. Marshall Street, Hartford, Conn.
... New York City-A. E. Wailes, 55 West 42nd Street, ... Ohio, -Dudley B. Trott, 12227 Clifton
Blod., Cleveland, ... Mid-Western, Richard J. Ferncass, ... West Coast-Robert H. Deibler,
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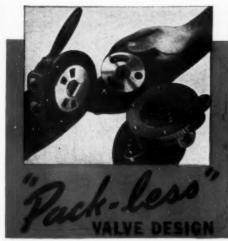
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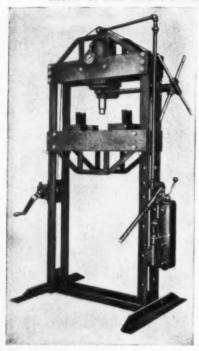
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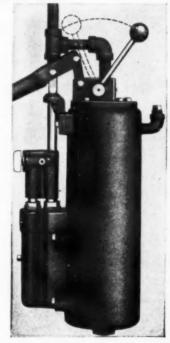
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A superintendent of a prominent western manufacturing company writes: "A short time ago we

company writes: "A short time ago we purchased several type "E" high speed precision tapping attachments equipped with the new "Procunier" TRU-GRIP Tap Holders. The positive drive effected from the chuck body through the collet to the square of the tap, is one of the finest arrangements that could possibly be put on a tapping attachment. The extreme smallness of the new TRU-GRIP Tap Holder which affords clear vision and close tapping to any wall on the part is very beneficial to us.

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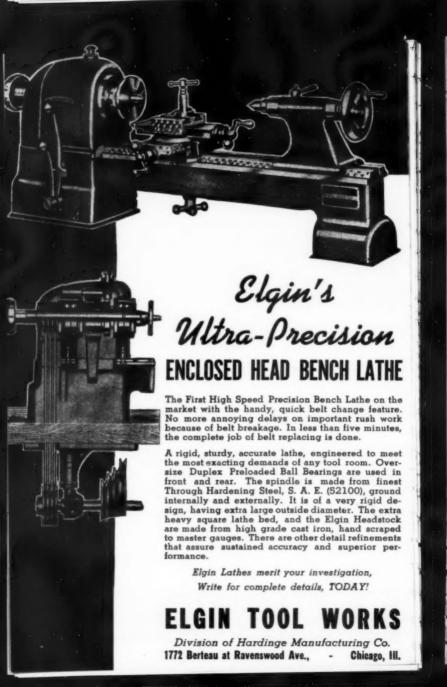
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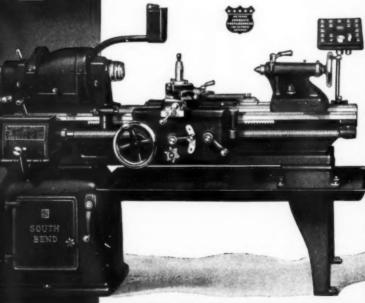
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To MAKE A PROFIT, in these highly competitive times, machine operations must be performed quickly and accurately. High spindle speeds and extreme rigidity are essential for efficient machining with sintered carbide or diamond tipped tools, especially when finishing die castings, plastics and other fast cutting materials. Precision and speed are therefore important factors to consider when selecting a lathe.

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# The Editor's Page

ONDONERS have shown they can "take it"—and in recent weeks, the heroic R. A. F. has raised Britain's odds materially. By their ruthlessness, the Nazis have been building up mountains of hatred and prejudice that will exist for generations.

Meanwhile, our own defense efforts have been moving with something less than full speed. It is unfortunate that our need for rearmament arose during a critical election year, for industrial and political processes do not mix without impairing the product.

Business cannot be blamed for desiring adequate plant write-off safeguards to cover the hazards of defense contracts. On the other hand, politicians have tried to prevent exploitation of the national emergency. The net result has kept defense efforts from moving into high gear.

Builders of machine tools have done an excellent job, increasing output and plant capacity materially, without going out of bounds. Not so long ago, they answered frantic appeals of the aircraft builders and saw that the right machines were delivered on time. Cooperation between tool builders shortened delivery dates on equipment for the Navy. For a long time ahead, the machine tool builders will have to hustle—and their patriotic support can be taken for granted.

The job that lies ahead is tremendous. It can be handled best in the American way with an efficient team-up of workers, management and machines—and a minimum of political meddling. And industry will do well to take workers and the public generally into its confidence—and explain frankly, the progress that is being made, and just what is happening.

Wesley G. Paulson



# Ryerson Night Loading Assures Quicker Deliveries

It's after hours, at any of the ten Ryerson steel plants, almost any night of the year!

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Ryerson Steel Service is fast and sure; Ryerson Certified quality is your assurance of uniformity and exactness. Make the Ryerson Stock List your unfailing source for all steel requirements. If you haven't the latest Stock List we'll send one gladly.

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# Training Youth for Industry

By FREDERICK E. SEARLE, Superintendent of Ford Schools

(In the past, a number of progressive organizations have maintained excellent training courses for apprentices and mechanics. Because of the present shortage of skilled labor, many additional companies are now considering or preparing training courses. To such, this outline of the Henry Ford Training School should prove interesting. Editor

DURING the last 25 years, Ford Motor Co., has maintained apprentice training for its skilled departments. In 1916 Henry Ford Trade School was incorporated by Mr. Ford as a private school for boys who had completed the grammar grades and desired training in hand skills.

Both of these schools were organized primarily to help the individual. In one of the company toolrooms, a group of young men were paying one of their number for instruction in shop mathematics at his home after working hours. When this fact came to the attention of the company, the instructor was requested to continue his work at the factory, with the company furnishing class room and instructor.

The following year Mr. Ford, who is fundamentally an educator and is always interested in youth, incorporated Henry Ford Trade School as a non-profit institution to help boys support themselves while continuing their education. That these two schools have been a source of increasing benefit to the company has been a by-product rather than the primary purpose of their origin. It is a confirmation of the





thought that plans which are educationally correct are also economically sound.

The last 10 years have been unusually trying ones for high school graduates. Because of the difficulty in obtaining jobs, more boys remained in school to graduate. A large number of these sought jobs in manufacturing plants. But as they had no training and as there was a surplus of common labor, few could be hired.

To make this transition from school to shop easier and to give more boys industrial jobs, Mr. Ford set apart half an acre of floor space with instructions to provide the proper equipment for such a training program. The space available had been used as a tool room and contained more than 100 machine tools. A crew of Trade School students and instructors were given the job of reconditioning the equipment and in the summer of 1935, the first of the high school graduates were enrolled.

To obtain suitable candidates, the schools were asked to cooperate by recommending their better boys.

At intervals, these selected lists are sent to the employment department of Ford Motor Co. While only local boys 18 or 19 years of age have been admitted, there is no restriction about the high schools from which they graduated. Boys from 151 high schools have been admitted, many of which are outside of Michigan.

They are hired at the rate of three or four per day, given employees' badges and assigned to a special department known as Ford Training School. For three months they are considered students and remain in the school, under constant supervision. At the end of the three months they are returned to the employment office and placed as workmen in the company's regular departments.

During the preliminary training period, the student receives 55c per hour and works from 7:30 to 4 o'clock, five days per week. Immediately on being transferred to his permanent location in the organization, he receives the minimum Ford rate of 75c per hour.

Many of these students have had some mechanical training in school before we enroll them. One said he had had experience on shapers, lathes, mills, and grinders, but very few have operated more than one machine and most of these as a class room exercise.

In this school, as in our others, the boy is assigned to a machine and such work is given him as the school has on hand, but simple enough for him to perform wthout an undue amount of supervision from his instructor. No pressure is put on him to speed the work but he is instructed from the first to operate his machine at such speeds and feeds as are consistent with good shop practice.

However, before undertaking any shop work the new enrollee is given a short talk on the subject of SAFETY. He also reads a printed list of safety regulations for the shop containing such clothing prohibitions as canvas shoes, long ties, long sleeves, or loose clothing.

At the outset we also stress ORDER-

LINESS—the proper placement of tools and cleanliness of the entire work area.

The boy is made to feel on his first job that dimensions must be held within the limits set by the blueprint-that ACCURACY is essential. When his measurements indicate that the proper dimensions and finish have been obtained, he asks the instructor to check them. The work is then submitted to the inspector whose decision is final. If there are several pieces requiring the same operation, only the first correct one goes through this routine. The student then completes the job, unless he runs into difficulties and turns the completed order over to the inspector. This method of checking the work has proved highly successful and the amount of spoilage as measured in hours hardly exceeds one per cent.

The fourth element that is stressed is that of TIME. It must be considered from the beginning. Although no student is hurried in his work, he knows how long each operation should take and without wasteful haste, tries to complete it within the time limit.

As a rule, boys are eager to work accurately and quickly. There is a feeling of pride which comes to a boy when he knows that his job has passed inspection and that he also produced the work in a reasonable time.

In large groups there are a few—a very few—who are not content to follow but must seek new methods and things to do. It is this small per cent that initiates all progress and drags us, willing and unwilling, toward new goals. Boys with this urge for ORIG-INALITY are encouraged to think, but little can be done to help them in the short period of this course. Boys that show evidences of ability to think orginally or inventively are placed in departments where they can be kept more readily under observation.

Because of the short training period, it is obvious that no great shop skill can be developed, but since these boys have been picked as the better workers in their various schools, they have the ability and the urge to accomplish much in a short time.

The student is given experience in

three or four departments, always under the same exacting shop conditions.

In addition to the toolroom equipment with a modern heat treat department, we also maintain a department for overhauling motors from the passenger cars and tractors used by the company.

A sizable electric repair department is operated for reconditioning small motors under one horse power.

Although the student is prevented by frequent shifts from becoming very proficient in any job, there is a large volume of useful work produced, for no work that is not needed for some purpose is given to anybody. No practice work is the rule in all our schools.

It is probably fair to assume that the income from the work produced, meets the actual cost of operation of the school if no charge is allowed for floor space and use of equipment. The machines are kept in repair by the students, under the direction of a special instructor, so depreciation is reduced to a minimum.



Under similar conditions we know that the School is more than selfsustaining because accurate records are kept. Even with an annual rental for machinery of \$120,000, the deficit barely exceeds one per cent of the \$2,500,000 annual cost.

As soon as a student is enrolled, he is required to attend classes in drawing and mathematics one hour per week for each subject. Classes in these subjects and many others are operated for the benefit of any Ford employee who cares to attend. All apprentices are required to complete a course in the subjects pertaining to their work.

When the Training School student has completed the three months of training and is placed in a department of skilled workers, he must continue his academic work. If he is sent to a production department, the matter is optional with him. However, 80 per cent of those placed on production, elect to continue the class work, hoping thereby to better their position with the company.

All class work in the Apprentice



School is free and a staff of 26 full time instructors is maintained. On the other hand, no Ford employee is given class instruction on company time. Classes meet at 8 a. m., 1:45 p. m., 4 p. m., and 5 p. m. This enables students to come, immediately before or after their eight hour shifts

Ford Training School has been in operation nearly five years and like its two predecessors, has proved its worth to Ford Motor Co., in providing a constant quota of earnest young men with some training, who are hoping to make work in industry their life business. Like the others, this school was opened to help ambitious boys, but it has also proven a lasting benefit to the company that sponsored it.

Because of the careful selection, few boys have dropped out of this short training course. They all had the staying quality required to finish high school and our selection was made from the upper half of each class. For this reason the quality of man material is above average. Most of those who left had excellent reasons, some of which were:—entering college, moving out of town, getting permanent jobs elsewhere. Less than one per cent has dropped out because of inability or lack of interest.

The school is now enrolling annually, between 800 and 900 high school boys who are seeking their livelihood in colored shirts, in grease, and grime. There is a growing feeling—at least in our community—that hand work is as important and praiseworthy as the efforts of the white collar worker.

The old bogey that shop training is for those who have not the mental capacity for, nor an interest in a classical training is fast disappearing all over the country. It is becoming recognized that he who would succeed in the skilled trades, needs a high grade of mental ability.

Success comes in the mechanical field as it does in all others. The man with an earnest purpose—a consuming desire—to become a master mechanic or anything else, will progress farther and more rapidly than he of equal ability, who is driven to his task or tries to



### SKILLED HANDS DESERVE SKILLED TOOLS

Die-sinkers, model makers, delicateinstrument parts finishers can do their best work only when their supplies of small files are right for the job—in shapes, sizes, cuts and quality.

Therefore, it is only logical that where speed and efficiency are the watchwords, industrial managements should turn to the world's largest file maker when stocking these important tools. For precision files require the precision manufacture which only long experience and ample facilities can assure.

Nicholson X. F. Swiss Pattern files are made to highly exacting standards. Points are smaller, tapers are longer and cuts are finer than in the conventional "American Pattern" files for similar purposes. Cleaning out, burring, enlarging small holes, shaping and finishing extra-narrow grooves, slots, notches and key-ways are more readily accomplished.

The automotive, aircraft, die-making and industrial-arts industries use Nicholson X. F. Swiss Pattern files extensively. Assortments are wide, designs are correct, and satisfactory performance is assured under the Nicholson broad guarantee of Twelve perfect files in every dozen.

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• Five popular shapes of Nicholson Die-sinker files in Swiss Pattern designs and cuts are illustrated above. Free Technical Bulletin.

### NICHOLSON X. F. SWISS PATTERN FILES





drive himself. Will power is for spurts. Desire is for a lifetime.

Each day three or four boys complete the training period and take their places in the ranks of Ford employees, to win their way as best they may in the struggle for preferment. There is scarcely a department in our organization that has not had representatives from this school.

Considering the shortness of the training, foremen in charge of these departments are pleased with the results. About 40 per cent have entered departments of skilled workers, such as tool and die rooms where they are classed as apprentices. Some of the earlier graduates have completed this apprenticeship and have received their journeymen cards. They have proven a valuable asset to Ford Motor Co, by providing trained men at times when Henry Ford Trade School could not supply enough.

The question is frequently raised whether public schools can give such effective training in shop courses that their graduates may enter skilled departments in industry. Of course, they can make a big contribution and many are already doing so, but they are handicapped in many ways. The expense of necessary equipment is usually far beyond that which its limited use would warrant. Perhaps the most serious problem is the difficulty of securing sufficient useful work to operate a school shop as a factory must, in order to live.

Making practice pieces is of doubtful educational value. Knowing the process by which something is produced, may be sufficient training in an engineering course, but the mechanic must be trained by constant repetition. This can be accomplished only by having a sufficient quantity of material to give the learner a chance to repeat a given operation in sequence many times.

To follow a given job such as the manufacture of a reamer from the round stock in the band saw, through the lathe, the mill, heat treat, and grinder gives a mental knowledge of the process. It is, however, an expensive process and in the end an expensive educational experiment, for even a large order, completed by one person this way, would give only a little experience in each department.

A few months spent in each of these departments, accepting the shop run of jobs, permits a thorough training in a shorter period and with greatly reduced shop costs.

Excess time required to produce material by students in training need not be great. Even in Henry Ford Trade School where we are training young boys, the time involved averages only about 20 per cent above that required by a skilled mechanic and the spoilage amounts to only one per cent.

Large units are not required for economical training in any age group. Our Trade School has grown from a unit of six boys and one instructor, sometimes rapidly and sometimes slowly, to its present enrollment of 1,800 boys and 125 instructors, and the relative costs have remained about the same. Personal -I have been engaged to appear on these pages by a proniment manu-facturer of are welding equipment, whose name Dim not at liberty to divelge at this time alter Ego



### A FEW APPLICATIONS OF S. S. WHITE FLEXIBLE SHAFTS

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Beacon Receivers
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Manufacturers of all products which incorporate flexible shafts will find S. S. WHITE a 100% dependable source of supply for all the shafts they need. S. S. WHITE has the facilities to meet all demands—on schedule and without sacrifice of the outstanding S. S. WHITE quality.

At the left is a partial list of applications on which the performance and dependability of S. S. WHITE Flexible Shafts have been time-tested and proved.

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FLEXIBLE SHAFTS for POWER DRIVES, REMOTE CONTROL and COUPLING

# If Bulky Tools Buck Profits

Advocating the Use of Smaller Auxiliary Tools to Handle the Smaller Jobs, Relieving the Tool Room and Releasing the Larger Machines for Heavier Work.

### By H. J. CHAMBERLAND

ONCE a \$3000 machine tool has been installed in a plant and frequently becomes a victim of idleness, the management has reason to grumbie. The cause is not always periodically curtailed production of exterior origin. This particular piece of equipment may lack the very versatile and flexible properties fitting the case. It may even be over-productive and this latter condition is by no means uncommon. On the other hand, most any bench-type tool can sleep four or five hours daily without causing the least industrial headache. I think we are justified in assuming that when a deal to purchase all heavy equipment is about to be con-

summated, the round - table powpow lacks harmony, informative data or else the decision is a one-man verdict.

Wouldn't it be a most productive and economical procedure to drop \$100 or so for light type equipment, into every \$1000-pot intended for medium size or heavy machine tools? This "tip" may have its "kinks" but it is a generally accepted fact, even in this era of modernization, that junior requirements form a neglected phase of manufacturing. This erroneous step tends to increase the production costs of many small tools and parts by operating comparatively heavier machines with a 100 to 500% increase in power costs, plus

Fig. 1 (left) Whether or not it is intended to grind a forming tool 100% after hardening, the average outline can be derived at a material saving by roughing on a bench shaper—then completed by grinding in the "soft" with wheels accordingly graded.

Fig. 2 (right) T-slotting, common production floor operation, is expedited in bench shaper. Quick-set up and there is no cutter sharpening.



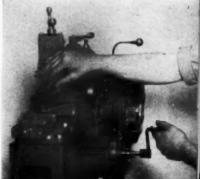




Fig. 3—Observe the design of this small jig—a typical tool room job for a bench shaper.

a substantial increase in labor charges due to handling bulkier accessories than are relatively necessary. This practice simply means an added tax, but one the New Deal knows nothing about. The possibility of turning a 6" x 18" billet in a bench lathe; surfacing and squaring a 1" cubic piece in a 15" shaper or using a 15-ton hoist for a 25-pound casting does not eliminate the fact that the triple idea is cock-eyed. The 1-10 ratio can stand juggling. However, it seems to represent the average comparative costs of heavy machine tools and their individually related bench models. Neither is this concoction

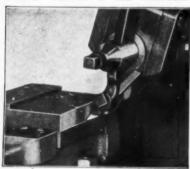


Fig. 5—Small fixture base held in vise; clapper head tilted for back stroke clearance in connection with tool post slide feed.

compounded for any particular item. The fact remains that the new Atlas Shaper is representative of a family of midget bench tools, and seems to offer a favorable background to stage a miniature demonstration of practicability and economy.

Raising the 10%

Before proceeding to consider what a bench shaper means to any machine shop, large or small, we had better digest the first argument which is likely to arise and here it is. "The fact that one has \$3000 is no sign that there's another \$300 in the bag." Well, if the

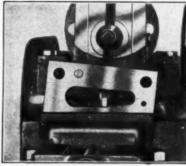


Fig. 4—A bench shaper makes a quick job of this die block after drilling a few holes and a little hand sawing.

matter concerns a large and prosperous plant, the difference is but "chick-en-feed." Since all plants are not prosperous and many of them expectantly surviving, let us attempt to produce that 10% without disturbing the budget. Whether a \$2000 or \$20,000 modernizing program is at stake, we have sufficient competition within the machine tool industry so that, exclusive of equipment specially designed for a single continuous operation or cycle, 10% or more often can be clipped off by disregarding certain exterior effects of a first choice and selecting a lower cost second choice with corresponding proproperties. If this can be ductive accomplished, even partly and the savings diverted to light equipit's like buying your tomobile tires at the regular price



Chasers that are accurately resharpened before becoming dull, long outlive Chasers that are run until dull and then resharpened free hand. You not only get better threads, but you get enough more threads from every set of Chasers to soon pay for the purchase price of this machine.

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Fig. 6—Accuracy of the square is sure to result by working directly from the table. Note open slots previously finished in shaper.

with a spare thrown in. A substitute way out for the wise executive is to let the other fellow take the licking. In other words, profit by the original buyer's mistake. Buying a new machine tool with today's good intention preceeded by tomorrow's disappointment, is a daily occurrence and like an automobile, the former can be well broken in and still be new. Therefore, the first move is to truthfully compare all available equipment in the category involved.



Fig. 8—The production floor shaper reconditions twin V-blocks—one of those "while you wait jobs" and no tool room back-talk.

Wide Field of Applications

Assuming, with a dash of comedy, that a 36" shaper brought into a watch factory would cause a mass attack of lumbago and a bench shaper in a locomotive shop would be considered a toy, the truth is that these extremes are but terminals of a long line of way-stations where we are likely to find one or more shapers, varying in size from the maximum to minimum conventional models. However, no less than 75% of all industrial plants have to produce a certain volume of small tools and parts well within the range of a 7" stroke shaper.

Obviously, the term "machining" ap-



Fig. 7—The cost of producing a dovetail combination in a bench shaper is less than by other methods.

plies to shaping operations which are in many shops as multiplied as those involving turning, milling, grinding, etc. While it is common practice for some manufacturers of heavy machine tools periodically to step down their individual models to smaller and smaller reproductions, few such undertakings ever reach a so-called bench or pedestal stage. When this does occur, the light equipment is more or less a chipof-the-old-block project. On the contrary, if a bench tool is created by blending all major properties of its elder relatives, it surely has something not found in a direct descendant. Bench Shaper in a Large Plant

Considering the low purchase cost of a bench shaper and its small operating

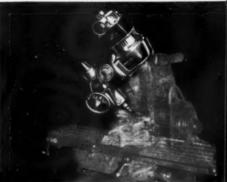
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**KEARNEY & TRECKER Corporation** Milwaukee, Wisconsin, U. S. A.

cost, I would rather put it this way:-What are the advantages of having two or more bench shapers in a substantially large plant? Since the cradle of any product lies in the experimental department, a small shaper in here will go far in improving facilities and siashrelated overhead expenditures which are not generally considered pinmoney. For the experimental room, such a move is not so much a question of economy as of convenience. connecting groups are somewhat of a secret organization favoring its own equipment rather than having to rely on tool room accommodation or serv-One of the best reasons for installing a bench shaper in the experimental department is because the machine would have all it could do to tend to its own requirements in a modern tool room.

From the point of view of an up-to-date tool room, the possibilities of the bench shaper are almost unlimited, to keep it humming either as a roughing agent or finishing tool. Since this small machine tool has ample versatility, its power cost for a 40-hour week should not exceed \$1.25 and its tooling cost is negligible. Thus, it seems to have everything necessary to make it one of the most appreciated pieces of equipment for tooling purposes.

Small tools which most economically



Fig. 9—Small part being shaped from soft steel. The original was die cast but the machine couldn't wait for a stock duplicate.

contact the bench shaper are flat-type forming and boring tools, used in engine lathes, turret lathes, boring mills, radial drills and automatics. An endless quantity of conventional tools for these production machines, and a variety of snap and journal gages, jigs, fixtures, including many accessories related to tool room practice. Any of the items mentioned may be of a nature to be partly or completely machined in a bench shaper. Forming tools, boring tools and many styles of gages represent a group which is customarily finish-ground after hardening. For this reason, I have many times advocated the use of the shaper to produce economically, an extended variety of small tool work. Obviously, blanks must be surfaced and squared in the shaper and a transfer to the miller for forming or outlining is a rather expensive move, when the change can be avoided. Contrary to the extremely low cost of tooling a shaper and the quick accessibility to its requisities, the milling machine involves a trip to the tool crib, plus a highly rated set-up time which often requires two or three-cutter changes. Even when a master forming tool is available, unless a form is not intended for grinding after hardening, milling is still very often a costly procedure due to slower stock-removing means. No production engineer discredits the fact that multiplied lost-motion and non-productive



Fig. 10 — Another example of the bench shaper's versatility—if it can't be held in a vise, this is one way to put it over.

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steps easily may run into a considerable item in a very short time.

Shaper and Surface Grinder Versus Milling

A bench shaper can well run nose to nose with any tool room surface grinder, for both have much in common as to diversified movements. theless, one should bear in mind that if the shaper used is large in proportion to the piece of work involved, the operating cost of the shaper will more or less effect the possible saving. It is therefore, a most practical and economical procedure, when possible, to rough on the shaper and finish on the surface grinder. The combined costs of shaper tools and surface grinder wheels are of no comparison to those of the plainest of master forming tools, formed cutters or gangs of cutters.

Once a form or outline has been layed out, either from a template or drawing, it is quick routine work to remove all excess stock in the shaper and still hold a clean cut to within 1/64" of the line. Single or combined angles, radii or segmental cuts are no barrier for the shaper. What can't be handled by the tool post slide or shaper vise can well be produced by substituting a small universal vise. At times, the filling machine can serve as an intermediary for roughing some hard-toget-at sectional cuts. Since soft steels

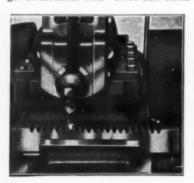


Fig. 11—Micrometer graduated cross feed screw dial accurately solves indexing problems such as this one.

require different wheels than hardened steels, the filing machine can often effect a further saving by avoiding dressing wheels for grinding in the soft. However, if a form is to be finished then and there and only polished after hardening, the filing machine should not supersede grinding for finishing any form.

A surface grinder, such as used in this case, has, of course, its limitations. For this reason, specially designed machines for form grinding have been available for some time past. At any rate, the milling machine cannot be disregarded altogether for certain designs of work positively demand flying or oscillating movements. In connection with jig, fixture and some accessory work, there is some drilling and tapping, and a contour sawing machine of course expedites the production of elongated open cuts, slots and open die work.

Figures 1, 2, 3, 4 and 5 are of minor but common operations well executed in the tool room bench shaper.

#### On The Production Floor

We have thus far given the bench shaper but certain tool work consideration. Let us now picture this versatile tool on a production floor. After all, what's a matter of approximately \$230, to avoid tool room overhead costs, re-



Fig. 12—A "jiffy" operation for the bench shaper. Whether one or two keyways are concerned, this versatile tool will do it for less.

# Graboloy Announces TH PRICE REDUCTION!

### Plus New "Universal" Standard Tools For **80**% of all Turning, Boring, Facing Job

Since the year when Carbolay tools were first introduced it has been the expressed aim of Carbolay Company to pass on to industry savings resulting from increased consumption and manufacturing efficiencies. As a tangible result of this policy, five major price reductions were put into effect between 1929 and 1939.

For a number of years, however, we have realized that if our ultimate goal of reducing the price of Carboloy cutting tools to a level that would make them available for the widest possible use, mass production methods of menufacture, through greater standardization, would have to be effected.

Towards this end one of our mojor activities has been to determine the minimum number of grades and the simplest line of tools that would be applicable to a substantial majority of carbide tool applications.

#### New \$1,000,000 Plant Part of Program

Concurrent with this we inaugurated a long range program of manufacturing development to establish maximum efficiency for standardized production. This culminated in the expenditure of a million dollars on a new plant and equipment completed last spring, having a production capacity of ten times the amount of cemented carbide then consumed by industry, with provisions for expending metal production to many times that amount.

#### Mass Production of Standard Tools Now Possible

Today we are happy to announce that this program has been completed. One of the outstanding results of this program new made available to industry is a line of standardized tools of prices that would have seemed beyond the realm of possibility only a few years ago. Indicative of the extent to which standardization has been developed is the fact that these tools—covering 80 per cent of all carbide tool requirements—comprise but five styles in only three grades—two for cost iron, and one for steel.

#### General Price Reduction on Carboloy Metal

A further result of this standardization program is that—because of the anticipated wider scale use of carbide tools—the cost of producing basic cemented carbides can be reduced to such an extent that we are able to announce the sixth general price reduction on carbide metals. This affects special tools, dies for working wire, bur, tubing and sheet metal. Carboloy wear-resistant inserts, etc., in propertion to the amount of Carboloy metal used in each product.

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accessories. placing worn money-saving ideas currently springing up and particularly for making mg up and particularly semergency replacement parts which may cause an extended delay, even if ordered by telegraphic code. While the bench shaper is a production machine for large or small-lot requisitions, it is most efficient and practical for machining single parts. Any problem is likely to develop on the average production floor and it is usually a case of single part production. With no bench shaper at hand, such jobs must contact the tool room at an increased total cost. Assuming that such work could be handled by any of the shaper hands, all foremen could make good use of the equipment for their individual urgent needs since one needn't be a toolmaker or all-around machinist to get results on a shaper. Listed are items which can as well be partly, or completely machined outside of the tool room:-

New height blocks, either plain or stepped.

Vee-blocks and holder-downs.

Forming tool holders of all descriptions, either plain or dovetailed.

Fixed guides, plain or adjustable.

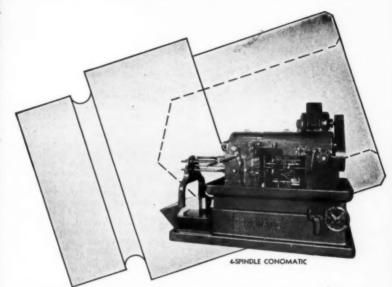
Square, angular, and rectangular holes, finished from drilled holes.

Internal and external keyways in shafts, bushings, collars and whatnots. Elongated holes, open slots, T-slots.

etc.

It should be noted that all parts mentioned and those shown in Figures 6 to 12, inclusive, are quite within the range of the bench shaper; contour sawing should be considered when effective and all irregular cutting left to the shaper. It is true that many parts can be purchased for less than they cost to make at home. The idea is to have the facilities to make specials more c2-onomically and regular ones quickly. It should be admitted by now, that if total plant requirements demand but a single bench shaper, it certainly should not get rusty.

Figures 13, 14 and 15—Three more examples of the versatility of this hardworking junior tool.



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THE 4-spindle Conomatic makes every second count on parts produced from bar stock. These seconds mean definite savings on every part, and present an opportunity for the progressive manufacturer to beat competition. Take the part shown here for example. It is produced in ten seconds — 288 per hour at 80% production!

The operations performed on this piece are as follows:

1st position - spot drill and form

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4th position — cut off (a special pick-off attachment is used so that every part is finished clean on the end.)

Don't neglect the simple jobs, because they are the ones that can earn or lose money the easiest. Save the seconds and make the profits on Conomatics. Whether your next job is easy or difficult, let Cone estimate it for maximum profits — there is no obligation.

hour



Part produced in 10 seconds on the 1/4" 4-Spindle Cons-



For complete details send for your copy of the 4-Spindle Conometic Catalog.

CONE AUTOMATIC MACHINE COMPANY
WINDSOR, VERMONT, U. S. A.



Fig. 16—Facing port bosses on an aircooled engine cylinder.

#### Improvised, But Practical and Precise Set-Ups

When a filing machine or power hack saw is not available, the only alternative is elbow grease or "jackass power, so, the bench shaper, like a bench lathe or drill press, is no slacker and takes on side lines. Unfortunately, a narration of stunts possible with the bench shaper, when pressure is applied, cannot be included in this particular arti-However, a few suggestions are permissible and may help one work out his own ideas as to how this or that job could be done therein, or, if a bench shaper would prove profitable, to undertake new projects quite impossible without this convenience

In the first place, the addition of a tool post grinder will turn the shaper into a precision surface grinder. For work within its range, it has all the advantages of a surface grinder such as traverse, transverse and vertical feed adjustments. In fact, it has a property not found in the conventional type tool room surface grinder, viz., combined angular adjustment and vertical tool slide feed. Thus, flat and angular surfaces on a piece of work may be ground without disturbing the work. Parts to be ground may be held in various ways, in the vise, top or side of table by removing vise. In fact, a

small chuck of the permanent magnetic type makes a fine addition, since this is really the only way to hold some work for surface grinding. So evidently, if you can shape it in the shaper, you can usually grind it also.

Secondly, many types of 1/4" or 3/6" electric drills can be used in a bench shaper, providing the idea is backed by a suitable fixture to hold the drill rigidly. This may be accomplished to a dependable degree by making an angle plate style fixture so the horizontal section will hold the drill as near the chuck as possible, the vertical section replacing the clapper in the clapper box. This set-up evidently means tapping two conveniently spaced holes on either side of the box for setscrews to hold the unit. Other means undoubtedly can be devised to work out equally as well as that above described. Regardless how the set-up is derived, it will permit drilling any layout of straight holes with the advantage of also drilling angular holes in two directions. Spacing can be held accurately by starting all holes with a center-drill. Holes also can be enlarged in a drill press by careful alignment through use of a plug gage or piece of rod.

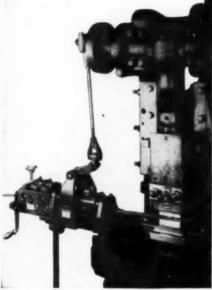
The shaper is also adapted to the use of several types of indexing fixtures which can be bolted to the table. Bench lathe gears serve as indexing plates to cut the desired number of teeth or spacings, the fixtures may be designed for internal or external work and to produce diametrical or sidelong cuts.

So, judging from the few suggestions it has been possible to incorporate with this material, it seems that the flexibility of the bench shaper insofar as as the idea of do-what-you-can-with-what-you-have is concerned, entirely depends on individual ingenuity. Such professionals as auto repairmen, community repair shop operators and model makers, and numerous basement machinists and expermenters, will find the bench shaper an interesting and profitable tool whether used for hobbying or to earn more dollars and cents.

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U. S. Automatic Pressroom Equipment U. S. Die Sets PRODUCTS

U.S. TOOL COMPANY, INC.



Fig. 1—Machining intermediate gear blanks, details and tooling for which are shown in Figures 1-A and 1-B and data is given in paragraph 1 on a succeeding page.



Fig. 2—Operations on feed gear shaft, details and tooling for which are shown in Figures 2-A and 2-B and description given in paragraph 2.
Fig. 3 — (below) Machining reversing feed gear. See Figures 3-A and 3-B and paragraph 3.

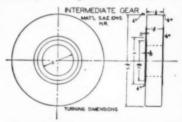


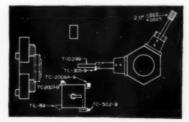
### Increasing

#### How a Lathe Builder Through the Adoption of

AN average production increase of 30 percent on 1000 operations, without the addition of new equipment or other shift — merely by changing tooling—that is said to be a recent accomplishment of the Gisholt Machine Co.

Gisholt's production problem is that of the quality 'job' shop insofar as its production quantities are relatively low, compared with those of mass production industries. But its problems do differ in that all the parts go into the assembly of completed machines. Bot-





Figures 1-A and 1-B (above) Details and tooling for intermediate gear. (See Fig. 1)

### **Production**

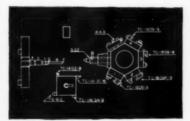
#### Stepped-up Output Modern Carbide Tooling

tlenecks cannot be permitted, since the lack of one part can hold up finishing and shipment of a complete machine.

In attempting to speed up its machine tool production, Gisholt found that the use of carbide tooling on many of its machining operations—1000 of them—and 80 percent of these on 'steel'—provided the necessary increase in capacity to raise output of the entire plant.

The accompanying illustrations, picked at random, show the manner in which carbides have been applied by Gisholt to steel cutting operations. Incidentally the company found that two grades of Carboloy—one for steel, and one for cast iron—would cover most of its machining requirements. In addition, 80 percent of all jobs are taken care of by only 10 shapes and sizes of tools.





Figures 2-A and 2-B (above) Outline and tooling for feed gear shaft. (See Fig. 2)



Figures 4, 5 and 6—showing machining of drive shaft, spindle and tool post respectively. See corresponding A and B Figures and paragraphs.



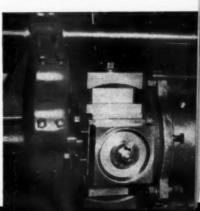




Fig. 7—Operations on forward feed clutch parts. (See Figures 7-A and 7-B and paragraph 7).

1. Intermediate Gear.

S. A. E. 1045 steel. Bore, turn O. D. for hobbing, face gear and shoulder, counterbore and chamfer—all with carbide tools. Speeds range from 78 feet per minute for boring, to 234 ft./min. for turning and facing.

2. Feed Gear Shaft.

Hy-Ten steel. Operations:

1. Face

Pull piece out to combination stop and clamp No. 532 (see drawing of tool layout).

3. Cut part-way off to length and

straighten. Feed .003".

4. Turn 1-9/16" diameter approximately one inch over full length 'A.'—Station No. 1.

Station No. 2—Turn diameter 'B.'
 Station No. 3—Turn diameter 'C.'

- 7. Station No. 4—Turn diameter 'D.'
- 8. Center part and insert center.
- 9. Cut four grinding grooves.
  10. Cut bevel at 'E.'
- 11. Round corner.

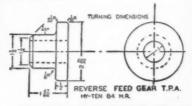
12. Cut off.

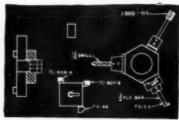
All cutting operations, with the exception of 8 and 11 are performed with Carboloy tooling. Stellite is used for rounding the corners. Facing, centering, grooving, beveling and rounding are performed with hand feed. Turn-

ing operations are all at .020" feed, while cutting off is done with .003" feed. Spindle speed is 360 r.p.m., with cutting speeds of 148 to 165 ft./min.

3. Reversing Feed Gear.

Hy-Ten steel. Faced at 290 ft./min. cutting speed and turned at 216 ft./min. with carbide tooling on the tool post. Feed for both is .009" Drilling, boring, chamfering and reaming, etc., performed with high speed steel tools on turret at speeds ranging from 42 to 106 ft./min.





Figures 3-A and 3-B (above) Details and tooling of reverse feed gear. (See Fig. 3)

4. Drive Shaft.

S. A. E. 1045 steel. All tools except center drill are carbide, including those for turning diameters A, B, C, etc., and facing the end. A .016" feed is used for all operations except centering. Spindle speed is 264 r.p.m. Cutting speed is around 150 to 172 ft./min.



Fig. 4-A-Photo of drive shaft. (See Fig. 4)



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Crank type ram-driving mechanism; complete V-belt drive; 4 speeds—45, 78, 122, 200 strokes per minute; cutting speeds from  $3\frac{1}{2}$ " to 116 feet per minute; 5 automatic cross feeds; horizontal table travel  $9\frac{1}{2}$ "; table to ram  $5\frac{1}{2}$ "; size 36" x 17" x 26" high. Operates from  $\frac{1}{2}$  H.P. motor.



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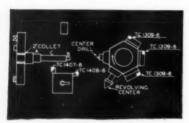


Fig. 4-B-Tooling for drive shaft.

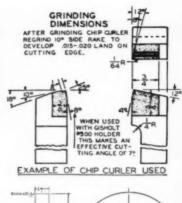
#### 5. Spindle.

S. A. E. 1045 steel. 250 ft. per minute cutting speed used for turning this large shaft at .025" feed, compared to .035" feed at 100 ft. per minute for high speed steel. Cutting time virtually halved.



Fig. 5-A—Spindle details. (See Fig. 5 and 5-B)





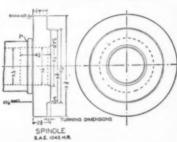
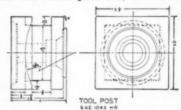


Fig. 5-B-Spindle turning dimensions.

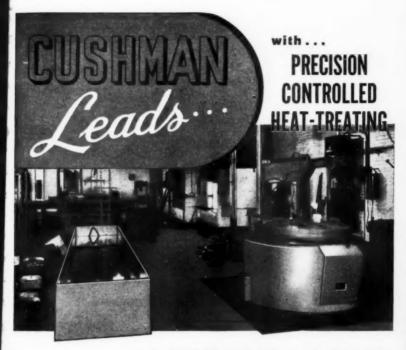
#### 6. Tool Post

S. A. E. 1045 steel. Operation here consists of boring the radius on 4 pieces for tool rocker plate rest, 268 ft./min.



cutting speed with a turret feed of .005". When one side of the four tool-posts mounted on the spindle has been machined, the tool posts are turned

Fig. 8 (left)—Machining blank for worm wheel. See paragraph 8.



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Said in Canada by Connocion Pairbanhs Morrae Co., Etd.

Fig. 6-A-Details of seat post. (See Figures 6, 6-B and 6-C)



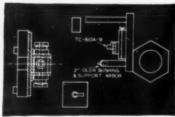


Fig. 6-B and 6-C-Photo of tool post and tooling details.

one-quarter way around. The second side is then machined, following which two more quarter turns and repeating of the cutting completes all four sides of four tool posts. Note the considerable interruption of cut in this operation.

#### 7. Forward Feed Clutch.

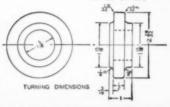
Hy-Ten steel. Speeds range up to 233 ft. per minute for the various operations, which include for this set-up:

- 1. Face to true up.
- 2. Drill bore
- Face to 1-15/16" diameter. 3.
- 4. Bore for reaming.
- 5. Turn large diameter.

#### 6. Chamfer bore, ream and round corner.

Operations 1, 3, 4 and 5 are performed with Carboloy tooling, the balance with H. S. steel.

FORWARD FEED CLUTCH HY-TEN B4 H.R.



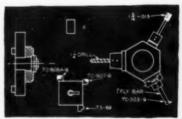


Fig. 7-A and 7-B—Details of forward feed clutch and new tooling.

#### 8. Worm Wheel.

Ampco bronze. Tough cutting material, rough and finish bored in two cuts at 224 ft./min, and .018" feed for each cut.







### INTERNAL COM GRINDING

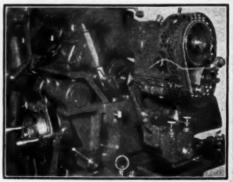
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Close-up of work showing Cam Grinding Attachment

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### Flexibile Shaft Versatility

Reviewing Informally Some of the Many Applications of this Handy Jack-of-All-Trades

#### By CARLETON CLEVELAND

THE ever increasing use of flexible shaft machinery for reducing production costs in nearly every line of manufacture is due primarily to two facts: — the ready portability of the equipment and the flexibility of the shafting. This permits a varied assortment of tools to be used easily and effectively in those hard-to-get-at places, so commonly encountered in shop production and assembly work. Grinding, polishing, buffing, scratch brushing, rotary filing, lapping, sanding, drilling, reaming, tapping, nut setting, screw driving, filler rubbing, tire buffing, and numerous other operations may be performed speedily and accurately.

Flexible shaft is essentially a means of transmitting portable rotary motion. Many unusual power transmission problems arising in machine design, have been solved in this manner, where limited space, relative movement, or position of parts have presented an obstacle. The term "flexible shaft" refers to a complete unit, including core. sheath or casing, handpiece, and motor connection for attachment to driving element. It can be attached di-rectly to the armature shaft at one end of a motor, or to the shaft of a worm gear reducer, making it porsible to obtain either high or low speeds at hand-piece. Some units are

An ingenious use of flexible shaft equipment in a tool and die shop, especially when the tool post grinder is busy elsewhere.





Using an angle spindle in grinding link motion in a railroad shop.

of which are equipped with pneumatic tires, providing easy transportation over rails and rough places.

Flexible shaft equipment has gained a very definite place in the modern tool and die shop. In touching up button dies, for instance, the toolmaker can easily pass a small mounted tool through a restricted opening in the die as it is held securely in a vise. Rotary files and grinding wheels are available in a wide range of sizes, types and shapes. With these files, wheels and cutters, wood and metal patterns may be shaped readily and precisely.

An interesting application is the sharpening of cutting tools. With this type of equipment, there is little reason for production line delays while tools are being resharpened or ground in the tool room. A portable machine can be wheeled or carried to any point in the shop, and a dull or poorly cutting tool resharpened without the necessity of tearing down costly sets-ups.

A large mid-western manufacturer of valves, fittings, and plumbing supplies makes extensive use of flexible shaft machines in many of its departments. These machines range up to 5-h p., capacity, depending on the character of work to be performed. Some are used with rapidly revolving wire brush wheels for cleaning scale from valves and pipe fittings, while other units are

equipped with a foot-operated rheostat, providing a variety of speeds to suit the individual operator's needs.

The size range of flexible shafts is practically unlimited. Small shafts are built for indicators requiring a very low torque capacity. Medium sized shafts are designed for remote control portable tools, and light machinery applications. Large shafts are built to transmit up to 10 h.p. at 1750 r.p.m; and even larger shafts may be had and employed where practical design permits.

Flexible shaft tools or grinders, range in size from delicate units used by jewelers and engravers for intricate work under the magnifying glass, to those husky brutes adaptable to snagging and other rough and heavy work.

To facilitate the convenient use of flexible shaft tools, equipment is supplied in various types:—bench plate, vertical or ceiling suspended types, and the pedestal types. Some units, for heavy duty service, are mounted on two, three, and four wheeled trucks, for ease of portability over rough flooring or in equipment yards. Units used in the yards of industrial plants and railroad maintenance shops are often mounted on small trucke, the wheels



An angle head is useful for touching up auto fenders and bodies.

An overhead suspended type of unit is particularly useful for the rough grinding and smoothing of castings.

used with an assortment of tools of suitable shape and size for grinding out dies and smoothing down rough spots on the inner surfaces of valves and fittings. For assembling and packing nuts on valves, the manufacturer of toilet flush valves uses a ½-h.p. flexible shaft machine of the suspended or vertical type. For screwing down the hinges on toilet seats, a ½-h.p. bench type unit is used; while a 1/3 h.p. machine of the portable type, equipped with wire brush is used for cleaning rubber molds.

Portability gives the machines a very wide field of usefulness about any industrial plant. The pedestal type unit on a ball-bearing caster base, or on a small heavy-duty truck, can be used at one bench, or if needed elsewhere can be readily transported anywhere on the premises. Several of the pedestal type, 1/4-h.p. and 1/2-h.p. units, are being used by a manufacturer of stove and furnace parts, the machines being stationed at different benches to be used by groups of operators as needed, for pattern grinding and for grinding and finishing fire pots and other stove. furnace, and boiler parts. In short, the machines are brought to the work instead of the work being taken to the machines. This battery of flexible shaft machines now accomplishes the work



Mica undercutter being operated in cramped quarters via flexible shaft, without removing brush rigging.



with less effort, in considerably less time and at last cost than when the work was done by the slow, hammer and chisel chipping method.

In heavy duty work, such as rough grinding of cast iron columns, roughing out large flanged iron castings, and for removing excess weld material, the flexible shaft portable grinder is indispensable.

A large bicycle manufacturer in Chicago uses several of these units on caster base mountings, for cleaning and finishing the welds on bicycle frames. employing abrasive wheels and special rotary files. A wide assortment of coarse, medium, and fine cut rotary files, burs, rasps, and routers of a variety of shapes and sizes, as well as mounted points and wheels, are readily obtainable for such uses. Rotary files have hundreds of uses in the average Users find them the handiest tools in metal pattern work, die sinking, routing, and high speed filing. They are used in many production lines for removing surplus material from electric welds, cleaning castings of



The ready portability of the pedestal unit makes it very useful around welding shops.

brass, bronze, and iron; and for burring, rounding corners, fillets, and for finishing places which are difficult to reach with any other tools.

In foundry work, burs are used instead of hand files for trimming and chipping castings. In the tire industry, they are used for roughing rubber prior to vulcanizing. In the iron and sheet metal shops, burs are used for removing weld marks in close corners. The flexibility of this type of equipment permits it to get to any point that a compact tool in human hands can reach.

Work that lends itself admirably to the use of flexible shaft units equipped with variable speed countershaft is wire brushing, disc and drum sanding, rubbing, polishing, and buffing. A highspeed of around 3750-r.p.m., is very efficient for grinding as well as sanding, the lower speeds being used for wire brushing, buffing, and polishing. One manufacturer ures portable units in grinding and polishing the inside surfaces of steel tanks for use in milk pasteurization and the preparation of milk food products. It is highly important that the inside surfaces of such tanks be free from all roughness or indentations to facilitate cleaning, preventing spoilage of the product. They

must be polished to a mirror-like finish. A similar finish is required in many tanks and containers used in the handling of chemicals and cosmetics.

Motorized flexible shaft dairy brush machines, mounted on white enameled three-wheeled motor trucks with the bright parts cadmium plated, have become indispensable in the cleaning of sanitary pipes and pasteurizing tubes

of dairy equipment.

Another of the many thousands of users is an important manufacturer of ice cream and dairy plant equipment. He has a veritable battery of flexible shaft machines of different types and sizes, spotted throughout the plant for grinding, sanding, and buffing applications. There is also a manufacturer of bar and soda fountain equipment who uses both vertical and suspended type, as well as portable machines. One-h.p. and 2-h.p. units are suspended by rollers from overhead I-beams and are used for buffing with cloth wheels, while 1/2-h.p. portable units are used for grinding and buffing wherever needed.

When floor space is at a premium and where it is desirable to have one unit readily accessible to various operators working at some bench, a vertical or suspended unit mounted on an overhead trolley is very satisfactory. There is no shaft weight to be consid-



Flexible shaft driven from auto engine is useful in boring highway guard posts for the cables.

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Buffing a mirror finish inside a stainless steel container.

ered, and both motor and shaft are out of the way and less likely to be dam-

aged. The history of the flexible shaft. through early use in sheep shearing machines, followed by adaptation to the old-fashioned dental foot-engine, and into a multitude of ramifications in industry, has been one of continued development and improvement. Indeed. the broader application of the flex-ible shaft is just beginning to be realized. Improvements are under way, leading to a reduction in the vibration so commonly found in the operation of rock drills, paving breakers, clay and trench diggers. More and more is the flexible shaft reaching into new-found places in road and construction work. Contractors find this type of equipment adaptable for use with concrete vibrators for eliminating voids, honey combing, air bubbles, and scaly surfaces, assuring better bonds with steel reinforcing and for producing a stronger, denser, concrete mixture.

The setting of guard rail posts along highways has been simplified by the use of flexible shaft machines. Formerly the posts were bored and sawed to length in a shop and then set. Today, the complete job is done right on the ground. After the posts are set, a truck comes along, and with suitable equipment, each post is cut to the right height, and holes are bored for guard cables. A circular saw, 26" in diameter. is used, the flexible shaft being 1-3/16" in diameter and 10 feet long. It is attached to the transmission of the truck, providing approximately 10-h.p.

at 3500 r.p.m. Despite the fact that these posts range from 6" to 10" in diameter, they are sawed and bored at the rate of two a minute.

The flexible shaft has also found a place in remote and rural sections, where it serves for the transmission of power generated from gasoline engines. It may serve to operate pieces of farm machinery or possibly a washing machine in the farm home. Small, moderate priced flexible shaft units are becoming a recognized part of the home work shop. Large bakeries find the rapidly revolving wire brush handy for cleaning pans as well as the shelves or trays of ovens and other bakery equipment, while hotels find the speedy buffer useful in polishing silverware.

In the boiler room, flexible shaft equipment has done much to simplify and make easier and less fatiguing, the skivering or cleaning of boiler tubes. And in motor repair shops, suitable tools in the handpieces are superseding the slow and tedious method of cleaning winding slots with chisel and file. Sanding discs are used to remove easily and quickly, old varnish and fabric. Also rust spots and sharp protrusions of steel and solder, leaving clean, full sized slots ready for the coils without danger of shorts and grounds.

In automotive shops, valve grinding and carbon cleaning are expedited.

Heavy duty equipment has been de-



Even the tire rebuilder uses flexible shaft machines.



BROWN & SHARPE

veloped especially for heavy grinding, sanding, and polishing work on large pieces in manufacturing plants. Fitted with right-angle attachments, these machines are adapted for sanding and finishing, wide and narrow surfaces, sharp curves, and contours such as large dies, propeller blades, auto bodies, metal doors and trim, and many other products with concave, convex, or perfectly flat surfaces.

Even for bridge construction, railroads, plantations, and reforestation projects, remote from electric current facilities, flexible shaft machines are used. These units are specially designed, employing compact, gasoline engine drives, mounted on pneumatic-tired, skeleton type wheelbarrows.

The material commonly used in the cable is a special grade of steel wire of high tensile strength and rigid specifications as to uniformity. The entire cable is uniformly wound, all strands being kept under the same tension, insuring a strong and unified product, carefully balanced, with in-

ternal friction reduced to a minimum. Cores are manufactured in a variety of wire combinations depending upon the diameter and the work for which they are intended. Sheaths or cases are of a variety of materials:—metal, rubber, leather, or fabric.

As occasionally happens, even with the best of care, flexible shafts may wear out or break. Modern development and improvement, however, has eliminated the liability of costly machine shut-downs and production tieups while awaiting cable replacements from the manufacturer. A new design of cable, of non-raveling type, developed especially for repair use, can be carried, in mill lengths, as stock in the user's shop. The required lengths can be cut off and replacements easily made.

Without equivocation, it can be said that the flexible shaft machine is an all-around helper in any plant, not only in production work, but also in handling those frequent and unexpected jobs that spring up from time to time, as well as in a multitude of plant and shop maintenance and general repair work. With an infinite variety of tools and attachments, it is daily proving its versatility and efficiency.

(Editor's Note:— For supplying helpful data and pictures used in this article we are grateful to the following manufacturers of Flexible Shaft Equipment:—R. G. Haskins Co., Chicago: Mall Tool Co., Chicago: Wyzenbeek & Staft, Chicago: Part & Whitney, West Hartford, Conn.; Stow Mig. Co., Binghamton, N. Y., N. A. Strand & Co., Chicago: The Charles L. Jarvis Co., Middletown, Conn.; S. S. White Dental Mig. Co., New York; Ideal Commutator Dresser Co., Sycamore, Ill.; Swartz & White Mig. Co., Binghamton, N. Y. The Dumore Co., Racine, Wis.)

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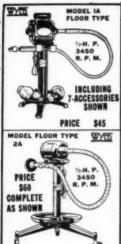


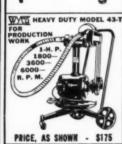
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### Milling Performance

Presenting a Few Interesting Case Histories of Typical Milling Jobs and Operations

> By M. R. CROSSMAN Barber-Colman Co., Rockford, Ill.

THIS problem escapes no one in the metal working industry, and in busy times like these it is very common. Suppose you could get from 30 minutes to several hours' extra productive time per day from your milling equipment, and at the same time obtain a finer finish and improved accuracy—would that help you to eliminate a bottle neck in your milling department, and assist you in meeting your production schedules?

Production men in numerous plants have found a way of doing just that. The answer is very simple and lies in reducing idle machine time. That is, reducing the number of times a mill has to be shut down to change cutters, to make new adjustments because cutters are dulling, or to replace cutters that otherwise fail too soon. These shut downs are costly and consume valuable productive time. The loss is increased when duplicate or sharp cutters are not available at the moment, and very often an operator has to setup some other job until they are available.

You'll say "This is obvious, and we don't buy cutters that we know won't stand up." Yet, there is a tendency to think of some jobs as "just tough," where cutters are not expected to stand up, or where the material "loads up" the cutter and scores work, etc. Cutters that were only "good enough"

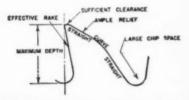


Fig. 1-An assortment of "Paraform" cutters of different types and sizes.

to get by before this rush, certainly are not good enough now, and it isn't always possible to buy extra milling equipment to relieve congested conditions, and permit deliveries that will be satisfactory. But still it is possible to find cutters that will lick those tough jobs, increase production, and produce economically.

Like many other problems, an answer can be found on the drawing board. There is no limit to design, and conditions continually are forcing cutter manufacturers to develop better cutters through improved design, experimentation, new heat treatment, and better manufacturing methods.

The "Paraform" cutter tooth form is one of these developments which is being used by a great many companies to advantage on many tough milling jobs. The "Paraform" design has been applied to an extensive line of standard cutters manufactured by the Barber-Colman Co., and it is illustrated in the accompanying drawing.



Referring to the drawing of the tooth form, it can be seen that the back of the tooth consists of two flat surfaces blended by a smooth curved sur-The relief back of the land is straight, to permit a minimum width land as the cutter is sharpened, and at the same time, maintain maximum strength at the important part of the cutter tooth. The flat surface on the back at the base of the tooth, combined with the curving blend between the two flats, makes possible a combination of maximum chip space and maximum strength in the tooth. The rake on the face of the tooth is properly planned for best cutting qualities, and the curve at the root of the chip space is of such a radius as to prevent jamming of the chips between the teeth, permitting

them to curl and flow out freely. Note that as the cutter is sharpened, the same tooth form is maintained throughout its entire length. A brief study of these typical operations will emphasize the importance of selecting the proper cutters in solving difficult milling jobs.

Part-Track links for track type trac-(Figure 2)

Material-Steel forgings; 4.4 to 4.6 Brinell hardness.

Operation-Milling both sides of a pair of track lines at the same time.

Holding-Nine-station, rotary drumtype fixture; two pieces per station held by a single clamp.



Fig. 2-Milling track links for track type tractors.

Cutters — 5½" diameter "Paraform" spiral face mills, 18 teeth per cutter. Feed-19.0" a minute.

Stock Removed-5/32" deep over the side areas of links.

Speed-71 r.p.m. Surface Speed-102.0 feet a minute.

Chip Load-.016" per tooth.

Production-260 pieces per hour. Pieces per Grind - 400 pieces, 200 pairs. Many times it is necessary only to resharpen the chamfer edge.

Part-Wringer gear housing cover for washing machines. (Fig. 3) Material-Gray cast iron.

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Operation—Milling cover surface. Stock Removed—3/32" x 3½" x 3%", (openings cored).

Holding — Indexing fixture holds 8 pieces, four being milled while the others are changed.



Fig. 3—Part of the evolution of wringer gear housing covers for washing machines.

Cutters — Two pair of interlocking side mills, each mounted between two heavy duty "Paraform" plain mills. Surface Speed—104 feet a minute. Feed—12" a minute. Production—160 pieces an hour. Pieces per Grind—200 for each set

Part—Tractor front axles. (Fig. 4) Material—H. R. steel, 180-190 Brinell. Operation—Straddle mill ends of two axles at one time.

Holding—Located by blocks in the table slots and clamped down at each end.

Cutters—Four 8½" x 1" x 2" "Paraform" side milling cutters.

Feed—1" per minute. Speed—22 r.p.m.

of cutters, total 4000.

Surface Feet—48' per minute.

Production — 3 minutes per pair,

floor-to-floor.

Pieces per Grind-500.

Part—Pitman for washing machine center drive. (Fig. 5) Material—Malleable iron.

Operation—Milling bosses on yoke ends of pitman rods; two at a time. Each boss is milled to 0.755"—0.745" thickness; distance between bosses held to 0.699" plus or minus 0.001".



Fig. 4—An important step in the making of sturdy front axles for tractors.

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Fig. 5—Milling pitmans for washing machine center drives.

Production—2 pitmans are milled in 55 seconds, floor-to-floor; more than— 130 complete pieces an hour.

Pieces per Grind — 9000 pieces per gang—with a total life of approximately 150 sharpenings equals 1,350,000 pieces per gang.

Remarks: — When the double side mills become dulled on one side, they are transposed, using the other side. After sharpening the interlocking mills, they are shimmed to restore the correct slot width. Cutters are resharpened until the original 5¾" diameter is reduced 1½", or to 4¼" diameter.

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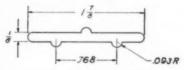
436 East Gardner Street . . . . Beloit, Wisconsin, U. S. A.

# **Punching Irregular Shapes**

By J. A. SMITH, President, Durable Punch & Die Co., Chicago

THE punching of narrow slots or irregularly shaped holes when the punches have thin sections is usually a troublesome job. This is especially true when the punches require replacement. Getting them machined properly, fitted and aligned is a long, tedious and costly task.

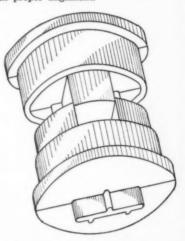
On jobs of such nature the piercing punch supported with the intermeshing sleeve, fills a long-felt need and also makes possible the punching of slots and shapes which heretofore, have been classed as impractical punch press operations. These jobs are now made possible by employing the same patent features on these punches that have made the punching of round holes smaller in diameter than the material being punched entirely practical.



When using these supporting sleeves, the punches are straight throughout the entire length, with the exception of the head, which on irregular shaped punches is made by upsetting to fit the countersink in the upper half of the sleeve. On straight slots, the punches are ground to size and the head left on in grinding.

When punches are used with the sleeve support, the replacement is very simple because the sleeves always remain in alignment and the punch replaced in the sleeve, requires no check up for alignment.

Making of the replacement punches is also comparatively simple in odd shapes. It is possible to machine a length of material long enough to make three or four punches, cut them off to their proper lengths, pein the heads, and harden. Even if they warp a little in hardening, the sleeves will keep them in proper alignment.



The illustrations show the construction of a sleeve for an irregularly shaped punch and also a specimen part. The punch is hardened, ground to size and ground concentric with a

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Fig. 1645

Flg. 1641

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Chicago St. Louis San Francisco predetermined point for alignment with the die.

In addition to sleeves made to hold a single punch, it is possible to build sleeves to hold more than one punch when necessary. On one job, a concern either had to punch or saw two slots 1/32" wide 9/16" long into .060" phosphor bronze with a h" spacing between the slots. It was a large production job, making two blanks complete at each stroke of the press.

The press was equipped with an automatic feed and operated at 100 strokes per minute. Two sets of special sleeves were required. The job worked out so well with supported punches, that additional installations on other dies are being made.



Although these jobs are using much lighter material and are not nearly so difficult, the production engineers recommended sleeve supported punches in these other dies because punch replacement with sleeves in the die is comparatively simple, and the punches are easier to make than they are with the previous setup, and consequently far more economical.

In addition to the advantage of cheap replacement, the punches are of a uniform size throughout, thus permitting a more uniform heat treatment and nearly all of them can be vertically lapped with a super finish and then chrome plated, adding tremendously to punch life.

The use of sleeve supported punches enables the reduction of clearance between the die and punch, and the holes can be punched with a minimum of break; in fact, practically straight through the material when so desired.



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# Carbide Tooling for Older Equipment

By JAMES R. LONGWELL, Chief Engineer Carboloy Co., Inc.

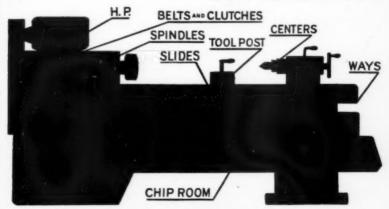
(While it is true that most of the newer machine tools will do a better job with carbide tooling than can be done with older types of equipment, this does not mean that such tooling cannot be used effectively on older machines.

be used effectively on older machines. Today, when it is important to increase productivity of all available machines—old and new—the accompanying specific recommendations covering older equipment should be of major general interest.)

In spite of the rapidly spreading adoption of cemented carbide tools to increase productive capacity of machine tools, particularly in the machining of steels, misapprehension apparently still exists in industry as to the usability of older types of machine tools.

There is no reason why older machines in good condition—such as turret lathes and boring mills—cannot be adapted readily to the use of carbide tooling. The fundamental consideration in old equipment, as well as in the new types of machine tools, is that the machine must be able to run fast enough—and smoothly enough at that higher speed.

In cutting steels with carbides, the main objective to be kept in mind is that cutting speed should be high enough to prevent forming of a "built-up" edge. This means an average cutting speed in the neighborhood of 200



Points to check on older machines, if carbides are to be used for machining of steel parts. The accompanying article contains specific instructions regarding each.

feet per minute. (The lower the carbon, usually, the higher the speed.)

To check the adaptability of any piece of available machine tool equipment to the use of carbides, the following general considerations suffice:

Power Requirement: It takes more power to run at the higher speeds required—to remove metal at a higher rate. It takes more power, also, to cut steel than non-ferrous metals or cast iron. Check the machine horsepower. Horsepower requirements may be calculated readily by the following formula:

HP (per tool) equals (Depth of cut in inches) X (Feed in inches) X (Surface feet per minute) X (Power Constant).

The power constant varies from 6 to 10, depending on the steel to be cut, as follows:

STEEL	CONSTANT	STEEL CONS	TANT
1010-1025	6	3115-3130	8
1030-1095	8	3135-3450	9
1112-1120	6	4130-4820	9
X1314-X1340	8	5120-52100	10
T1330-T1350	9	6115-6195	10
2315-2320	7	Cast Steel	9
2330-2350	9		

The power required to operate the machine at speed, with tools not cutting, must be added, of course, to obtain motor horsepower. This requirement is usually figured as 30 percent of the h.p. required for cutting.

Power Transmission: Having determined the power requirements for increasing machine speed to take full advantage of carbide tooling, belts, clutches, etc., should be checked for ability to transmit the horsepower to the spindle. Clutch fingers should be adjusted to prevent slipping and stalling. Where machine is equipped with a flat belt, it is usually desirable to change to a Vee belt drive, making sure that the number of belts is adequate.

(Note: — If machine stalls in the cut, loosen holding screws and remove tool from the cut to prevent breakage. Do not attempt to move work or try to back tool out of cut.)

Centers: The increased rate of stock removal at high speeds with cemented carbides makes it advisable to use an anti-friction tail stock center.

Spindles: Spindles should be checked for adequate lubrication at the higher speeds at which they will operate.

Tool Posts and Holders: Where machines have rocker tool plates, these should be eliminated and a solid support provided. A set of shims should also be provided to maintain the tool at proper cutting height.

Chip Room: Provision must be available to handle the increased volume of chip production. Where openings in machine beds and around tool holders or blocks are too small to allow chips to get away, sheet metal chutes frequently prove helpful in eliminating pockets and slots where chips are apt to clog. Chip breakers can be used, of course, where size of openings demands production of small chips.

Back Lash: Before cutting steel with cemented carbide tools, machines should be checked for excessive clearances which would cause chatter at the higher cutting speeds. Worn bearings, slides, and ways should be corrected. It should be mentioned, however, that a certain amount of chatter can be corrected by the incorporation of negative rakes in the tools—where it is found impossible or impractical to tighten the machine up sufficiently to eliminate all vibration.

With these simple considerations, there is no reason why any machine cannot be used effectively for cutting steels with carbides, particularly where single point cutting tools are to be used. If the machine is capable of handling the horsepower required at the higher speed and can be tightened up sufficiently to eliminate back-lash and chatter, no trouble would be encountered in greatly increasing productivity per machine with cemented carbide tooling.



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R ECENTLY American Broach & Machine Co., Ann Arbor, Mich., delivered equipment to a prominent manufacturer, to be used in connection with the Defense Program.

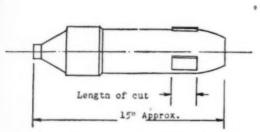
The machine was a standard V-2-6 ton vertical hydraulic press with control latch to hold machine ram in lower position while operator indexes or unloads part, and speed control unit.

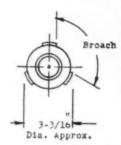
Tooling—Work-holding portion and broach guide assembly mounted on common base. Floating ram attachment.

Figure 1 shows fixture in broaching position. The shell nose rests in a formed adapter. The boat tail is held in a chuck operated by the knurled hand wheel directly above the shell. Clamping of work into bottom locator is accomplished by means of the fixture lever shown in the center.



The broach section is limited in length by the distance between the rear and the forward bourrelets. The broach section is mounted upon a hardened and ground broach holder assembly, guided in the fixture, with the broach adjustable into the part by means of the taper wedge adjustment shown on top of the broach holder. In





broaching position, the work holding portion of the fixture is securely latched

in place.

Fig. 2 shows the work holding portion of the fixture manually tilted back to loading or indexing position. A counterbalance is provided on the fixture trunnion shaft to facilitate this manual operation. In clamped position as shown, the part is centralized at both ends and supported by means of an automatic jack directly behind the broaching cut. Fixture design is such that the part can be securely clamped down into the bottom locator and in-

dexed for the required number of passes without being unclamped. Manual index is obtained by release of the index plunger, the lever for which is upon the extreme top of the fixture. Indexing is by means of the same knurled wheel used to chuck the boat tail end of the part.

### Cycle

1. Load part into bottom locator, move down upper fixture assembly by means of righthand lever. Chuck part upon boat tail end. (With fixture in loading position as in Fig. 2)

 Tilt fixture forward to broaching position as shown in Fig. 1. Start broaching stroke by means of lever or pedal control.

3 Machine ram is latched at down position at end of broaching stroke with fixture automatically unlatched. Return fixture to indexing position (Fig. 2) manually. Index part by manually releasing index plungers and turning knurled wheel shown above boat tail end of part.

 Release machine control latch shown at right center (Fig. 2) which allows machine ram to return to up position.

Manually tilt fixture into broaching position.

 Repeat above operations until all grooves have been broached, and unload finished part.

Material — Free machining steel. Stock — Approximately .025" depth of cut. Length of cut — 1-\%" approximately. Operating cycle - 45 seconds. Production—70 pieces per hour at 85% efficiency.

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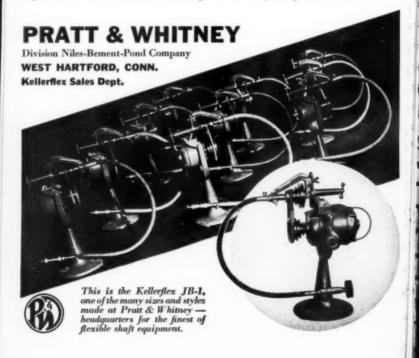
# KELLERFLEX Mobilizes

# to solve your finishing problems

Kellerflex Flexible Shaft Equipment has played a big part in eliminating production line kinks. Many jobs formerly requiring hours of manual finishing are completed in minutes with Kellerflex. Burring...Sanding...Grinding...Polishing—there are thousands of finishing

operations that these powerful little machines will do quicker and better.

Experienced Kellerflex engineers stand ready to go over your finishing problems and advise which of the complete line of Kellerflex equipment and accessories will prove best for your particular work.



# Individual Drives

A Pioneer Forging Company Modernizes Machine Tool Drives In Its New Machine Shop

By FRANCIS A. WESTBROOK

THE Kropp Forge Co., Chicago recently erected a new shop for the machining of forgings. This Company produces forgings in very great variety, according to customers' specifications. Consequently the machine shop is equipped with numerous tools, such as engine and turret lathes, milling machines, shapers, planers, automatic screw machines, multiple spindle drills and hollow boring lathes of large size, etc. There are also two large gun lathes which will take work up to 41 ft. in length, in fact forgings up to 20 tons are machined in this shop.

In view of the fact that such heavy

work is handled here, the shop is served with an overhead travelling crane spanning the whole space, so as to reach every machine tool in the shop. This has made it necessary to avoid overhead shafting and overhead belt drives on all tools and resulted in the adoption of Cullman individual drives, which are highly desirable on account of the specialized type of work done here. It is not a high production shop, but more nearly a job shop, in which some tools may remain idle at times. Consequently, it would be difficult, if not impossible, to arrange for group drives without unnecessary waste of power.





This FREE trial offer permits any concern with a satisfactory credit rating to try out any Kipp Air Tool for ten days. Grinders sell from \$9.75 to \$\$8.75, Chippers and Filers at \$19.75. The BB Grinder illustrated is only \$25. Kipp Air Tools give you highest speeds, lowest prices and are proving indispensable in tool rooms and production departments. New catalog gives details.

FREE	TEN DAY TRIA
H. S.	FREE CATALO
	☐ Send Kipp Air Grinder Model BB on your 10 day Free Trial Offer!
water to exist expects	☐ Send the new Kipp Air Tool Catalog!
Name	*******************************
Company	
Address	****.**********
MADISON	-KIPP CORPORATION
ZOT WAUBES!	ST. MADISON, WIS. U.S.A.

Many of the tools have cone pulleys, including the lathes, shapers, milling machines and other special machines. Some of the lathes and their drives are shown. These drives are interesting because they consist of a complete unit, designed by Cullman, for simple attachment to the beds or bases of the machines.



The drives were easily installed by drilling four bolt holes in the beds of the machines for attaching the upright elements, carrying the motors. The drive units are belted to the upper cone pulleys. A lever is provided for raising and lowering the pulley for belt shifting and adjusting belt tension.

In performance, the drives have shown a low maintenance cost, due to the fact that all bearings are enclosed, operating in oil baths. They are reported to have increased the efficiency of the tools on which they have been installed, on account of the flexibility of operation and improved control.

The drives are employed on vertical boring mills, planers, lathes, die sinking machines and other equipment in this shop, some 15 units being in use today. Increased efficiency, measured in production alone, is estimated at approximately 18%, and contributary values, better lighting, reduced belt maintenance, etc., accrue.

Belted-avel

DRILLING

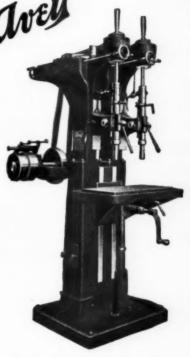
and

TAPPING

MACHINES

The value of a tool not only depends upon the amount of work it will produce but upon the quality as well.

Avey products include a wide variety of types and sizes in standard single and multiple spindle, general purpose machines.



If you have a difficult drilling or tapping problem, consult our Engineering Department. No obligation, of course.

avey for ECONOMY DEPENDABILITY

THE AVEY DRILLING MACHINE CO.



these major money saving advantages on any metal cleaning or finishing job. They are easily wheeled right up to the work-operate from any regular electric current outlet and eliminate the need for frequency changers and costly compressed air.



MALL 3524-D 3/4 H. P. Grinder. Other Models 1/2 H. P. to 3 H. P.

A constant speed, aluminum frame, dust and vaporproof or ventilated type motor delivers a steady flow of power through the heavy duty flexible shafting to the working tool-thus placing 2 to 3 times the power in the operator's hands with a minimum of weight. The same power unit can be used for SANDING, WIRE BRUSHING, POLISHING, DRILLING and GRINDING due to the interchangeable attachment feature of these working tools. There's a MALL grinder for every job!

Write for illustrated circulars. We make over 200 gasoline engine, air and electric motor driven portable power tools, flexible shaft machines and attachments. If you have use for any type of power tool, consult us immediately. We can furnish tools that will definitely save you time, labor and money on all of your production jobs.

# **Expanding Use of Carbides**

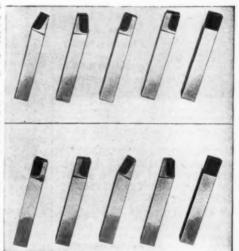
MANUFACTURED now on a mass production basis, the new line of cemented-carbide tipped standard cutting tools introduced by Carboloy Co., Inc., 11139 E. 8 Mile Road, Detroit, Mich., are likely to alter industry's buying habits in connection with carbide tools.

In the first place, mass production economies permit prices so low that they are likely to decrease the amount of brazing and grinding now done by organizations who at present purchase Carboloy tips to produce their own tools.

In addition to covering, in five standard styles and three grades, the vast majority of all turning, boring and facing applications in industry, the new standard tools are also capable of simple conversion, by the purchaser, into hundreds of forms of "special" tools, thus obtaining such tool forms at a total cost only a little more than for new standard tools.

& GO O)

Fig. 1 shows two complete sets of tools—one for cast iron and one for steel—in one of the 7 sizes in which these



standard tools are available. Ready differentiation between tools designed for steel cutting and those intended for machining of cast iron is provided by coloring of the shanks. Those for steel are copper colored. Those for cast iron are finished in "aluminum."

Introduction of a standard line for machining steel has been facilitated by development of a general – purpose grade of Carboloy for steel cutting. Tools of this grade (78B) will stand more abuse than those of the 78 grade, while they also have greater resistance to abrasion than the 78A grade. They are designed to take cuts up to ½" deep, and feeds up to .030". For machining of cast iron, the standard tools are available in two optional grades.

Shown in Fig. 2 are typical examples of special tools which may be pro-



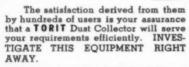
Model No. 52 with the door of the steel cabinet removed, showing the motor, fan-housing and spark-resistant filter bags.

THE SAFEGUARD PROVIDED BY TORIT DUST COLLECTORS—TO VAL-UABLE EQUIPMENT, AND TO WORK-ERS' HEALTH, THEREBY INCREASING THEIR EFFICIENCY— is PROTECTION YOU CAN'T AFFORD TO BE WITHOUT.

Available in several sizes, ready to be piped to pedestal grinders, surface grinders, bench motors, buffers, cut-off machines, etc., they gather dust and grindings and return the air absolutely clean. Since the air is re-

TORUT

circulated, there is NO HEAT LOSS! The rear view sketch at the right shows a TORIT Dust collector connected to both wheels of a grinder—typical of many types of possible installations.



Write for our new bulletin today.

Torit Manufacturing Co. 303 WALNUTST ST PAUL MINN

duced from standard tools through simple grinding operations.

Dotted lines indicate original shapes the tools. Tools "A" and "B" are of the tools. grooving tools, the first for square grooves, the other for formed grooves such as are used in pulleys. Figure "C" is a further type of forming too!. All three are derived from Style No. 1. "D" shows how a style No. 7 tool can be converted quickly into a chamfer-ing tool, while at "E" a facing tool has been produced from tool Style No. 4 by simple grinding back of the shank. Engineering studies indicate that well over 200 forms of tools formerly purchased as "specials" may be produced from this last mentioned style alone. By far the major proportion of all single point tools can be made by the purchaser from the new standard styles at a lower cost than through the purchase of special tools.

All styles and sizes will be stocked for immediate delivery. All styles are finish ground, ready for use, including even grinding-in of a chip-breaker on tools designed for steel cutting.

### **Drawing Die Line Extended**

Availability of standard Carboloy round hole dies for drawing sizes of bar and tubing up to 3-½" diameter, and improvements in construction in the larger series—R7 to R16—of standard drawing dies, are announced by Carboloy Co., Inc., 11139 E. 8 Mile Road, Detroit, coincident with announcement of price reductions on all dies.

Tendency to use cemented carbide dies for larger sizes of bars and tubing has led to the introduction of the R-18 type as a standard die. Nib dimensions of the die are 5.50" diameter by 2,125" in height, with a casing dimension of 9" x 3-¾". It is designed for drawing work ranging from 2-¾" to 3-½" diameter.

In addition, "cored" dies previously available only in the smaller—R1 to R6 series, are now also available in the series R7 through R10, for drawing fractional sizes of bar and tubing from 3/16" to 3/4". Rough drilled dies, available previously in these sizes—in addition to finished dies—are continued.

# TAP 2400 HOLES PER HOUR

Ettco-Emrick

Two Hand Feed Foot Operated – Two Spindle

TAPPING MACHINE

This new, standard tapping machine handles parts with one or more holes, two at a time, at an average production of 2400 holes per hour.

Work holding fixtures are usually very simple, without guide parts or strippers.

Special tapping heads, up to 12 spindles, for two hand feed, produce up to 12,000 holes per hour.

Let us look over your job and submit our recommendations. No obligation.

ETTCO TOOL COMPANY
594 JOHNSON AVE., BROOKLYN, N.Y
DETROIT CHICAGO





THOSE plans you've probably made for stepping up productionput teeth in them-carry them out according to schedule. A Wells Metal Cutting Band Saw can help you do it. The Wells Saw is one of the handiest all-around tools a plant can have for continuous production on the dozens of odd jobs—cuts bars, angles, tubes, plates—fast, accurate, portable and dependable. It puts its teeth in metal and bites through in a hurry—helps in a hundred ways to keep things humming.

Write for details NOW.

WELLS MANUFACTURING

METAL CUTTING BAND

# Hard Facings and Overlays

A N interesting and useful group of hard facing alloys and overlay metals has been developed by Wall-Colmonoy Corp., 6th Floor Buhl Bldg., Detroit, Mich. For these, the makers claim greater resistance to wear and corrosion than has been available heretofore.

Colmonoy products are described as containing diamond-like crystals of patented chromium boride (CrB2) distributed through a hard metal matrix. Many different grades to meet specific needs are ob-

tained by varying the base metals. A base of nickel, for instance, gives a product that is highly resistant to wear



and corrosion—Colmonoy No. 6. In contrast, No. 1, with a base of steel offers high resistance to impact and abrasion with some increase in corrosion resistance.

Due to the fact that the small embedded particles of CrB2 in the matrix do not affect ordinary hardness tests,



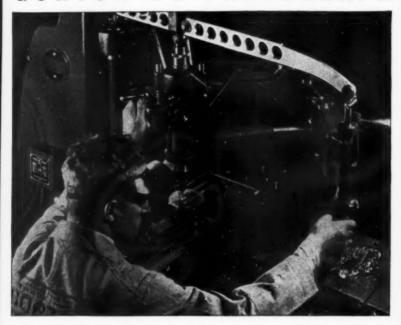
readings so obtained are said to give little indication of the metal's abrasive resistance, compared with other metals of like hardness. Colmonoy metals, it is asserted, ordinarily wear several times as long as other hard metals of equal indentation hardness.

On hard working machine tool parts such as lathe points, dogs, chip breakers, drill flutes, wire straightening shoes, thrust bearings, screw machine fingers, grinder feet fingers, centerless grinder rests, forming and drawing edges. Colmonoy No. 6 is said to be showing substantial savings. It may be cast or applied as an overiay, using either gas or electric welding equipment.

Colmonoy No. 9 is suitable for application to tools and dies which must retain a cutting edge at elevated temperatures. Can be used with good results as tipping on many edged tools for cutting wood, metals, earth or stone. Can be welded on annealed on air hardening steel for use on hot or cold forming dies, an example of which is shown. It may be cast easily and in such form is recommended for small or intricate parts where overlaying is impractical. A few of these typical cast parts are shown.

Bulletins are available describing the properties and uses of all these alloys.

# GORTON 3-L PANTOGRAPH



The Gorton 3-Dimensional Pantograph reproduces from enlarged models and masters in either 2 or 3 dimensions. In addition to being used for modelling work, the 3-L can be used for all types of work ordinarily done on 2-dimensional machines, including machine engraving and profiling. Available in two sizes.

WRITE FOR CATALOG 1580.

GEORGE GORTON MACHINE CO. 1115 13TH STREET, RACINE, WISCONSIN, U.S.A.

# What's New in the Industry

### Hardinge High Speed Precision Lathe

THE attractive modern machine shown is the new Hardinge high speed precision lathe. It incorporates features pioneered by Hardinge Brothers, Inc., Elmira, N. Y. These include:—enclosed head with preloaded ball bearing spindle construction; electrical driving unit with multi-speed motor, eliminating all gears, clutches and loose pulleys; convenient lever speed control at the headstock of the machine, and the latest development, the welded, all-steel pedestal.

The bed of the machine is generously proportioned and rests on three spheres for perfect three point suspension to guard against distortion which may come from an uneven floor.

Headstock bearings are fully enclosed in an inner chamber. excluding foreign matter from front and rear ends of spindle. Rear end of spindle carries a double "V" pulley for two endless belts from the driving unit. The endless belts may be applied or removed without removing headstock spindle or bearings. A hand wheel is provided for turning the spindle by hand when setting up, making tests or when finishing a thread by hand. The collet draw spindle is notched for a spanner wrench, supplied with the machine, and has a ball bearing section to absorb

The compound slide rest features large beveled dials for ease of reading. The adjustable dials are plainly marked and graduated in thousandths. The compound slide rest features large beveled dials for ease of reading. The adjustable dials are plainly marked and graduated in thousandths.

Spindle is graduated to eighths and hand wheel to thousandths of an inch.

The two levers at the headstock end control low-Stop-High and Forward-Brake - Stop - Reverse spindle speeds through the operation of electrical motor controls. A metal chart, at the front, shows speeds obtainable from the driving unit. There are 8 forward and 8 reverse speeds ranging from 230 to 3900 r.p.m.

The welded steel pedestal completely encloses motor and driving unit, with the motor completely insulated from pedestal by rubber cushions. Motor



belt is easily changed from one step of motor pulley to another through a large door in front of pedestal. Cabinet storage space with two shelves for tools and attachments is reached through door on right hand side of pedestal. A collet board, mounted on the door, provides storage for collets and lathe centers. The pedestal is arranged for adequate ventilation.

The brake permits rapid stopping of spindle, to increase production in tool rooms and production departments. An important feature is that brake adjustments may be made from front of machine without removing any part.

Five sizes are offered, up to 1" collet capacity and 9" swing, which is the most popular size.

### Colonial General Purpose Presses

A line of moderately priced, general purpose hydraulic presses for such op-



erations as assembling, broaching, etc., is announced by Colonial Broach Co., Detroit, Mich.

Designated as the "Senior" line, the 7 sizes range in capacity from 1 to 10 tons, with strokes ranging from 18" to 42". Complementing them, the "Junior" line of Colonial presses covers the lighter duty press field.

The new "Seniors" are designed for maximum flexibility of operation, regardless of the type of application for which they may be required.

With motors located within the columns, they require floor minimum space Open side fixed table construction permits working on long parts, extending beyond the machine table—as for straightening or assembly. An exceptional amount of daylight is provided to allow for large fixtures, without sacrificing stroke. Work platen is removable for machining of special clearance holes as required.

Rugged reinforced construction is used for the frames to assure rigidity. The cylinder bearing is in the neck of the frame, eliminating unsightly protrusions as with "stove-pipe" cylinders.

The cylinder is of leak-proof steel tube construction. An integrally welded flange transfers working thrust directly from working cylinder to frame.

Standard hydraulic pumps and equipment are used for economic replacement. Pumps are of large capacity, direct motor - driven. Located within the oil tank, the pump has exceptionally short suction, adding to pump efficiency. Large oil tanks insure cool oil for the hydraulic system.

Large coolant flow, where required, as for broaching, is provided through the use of an oversize centrifugal pump on base, driven by a separate motor. Chips may be removed while machine is in operation—without disturbing the operator—by means of generously sized chip troughs in side of column.

"Senior" presses can be furnished with controls to stop operations at top or bottom of piston stroke, or with an automatic return after piston has completed its downward travel.



Contact your nearest Midwest office-Cincinnati, Cleveland, Chicago, Indianapolis, New Yerk, Philadelphia, Pittsburgh, Salt Lake City, Springfield, Mass., St. Louis, Syracuse, Tulsa, Toledo.

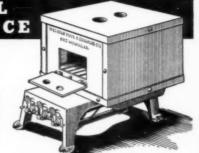
# ECONOMICAL BENCH FURNACE

# NO BLOWERS OR AIR PRESSURE REQUIRED

Fast, Even, Indirect Heat

A compact solidly built and efficient hardening and tempering furnace. Cast iron body with light weight, high refractory lining and cast ni-chrome grate. Pyrometer opening in rear wall. Three burners equipped with pil t lights. Rise in furnace temperature approximately 100 degrees per minute.

Depth Size of Opening Shipping Weight 2%'x5" 71 85 lbs. Specify whether mixed or natural gas is used. Price, \$55.



# WESTERN TOOL & STAMPING CO DES MOINES, IOWA

LET US OUOTE DIES AND METAL STAMPINGS WESTERN TOOL & STAMPING CO. Des Moines, Iowa

IOWA DISTRIBUTORS FOR MARSHALLTOWN LINE OF PRESSES WESTERN TOOL & STAMPING CO. Des Moines, Iowa



### G-E Hook-on Volt-Ammeter

A versatile, portable instrument, the Type AK-1 hook-on volt-ammeter, for measuring alternating current and voltage has been introduced by the General Electric Co., Schenectady, N. Y. With it, alternating current can be read instantaneously on both insulated and noninsulated conductors, simply hooking the instrument around the line. For voltage readings, it is necessary only to connect two leads furnished with the instrument and then flip the thumb - manipulated selector switch to the desired voltage position on the scale.

Designed for use on conductors of 2-inch maximum diameter, the new volt-ammeter is small enough to get into tight places, light enough to be hung from a lineman's belt, and sufficiently accurate for a great variety of measuring jobs. Weighing only 31/2 pounds, it is designed for easy, onehand operation. Four current ranges.

0-15/60/150/600 amperes, and two voltage ranges, 0-150/600 volts are available at the setting of a convenient sixposition snap switch. Its accuracy is within 3 per cent.

Hydraulic "U" Packing

Wayne Davies Packings, Inc., 325 West Huron St., Chicago, are now in production on their new reinforced hydraulic "U" packing and are equipped to furnish it in section sizes from 1/2" to %" inclusive, for any plunger dia-meter from 9" to 90". Equipment is now being installed for the manufacture of all section sizes from ¼" to 1-¼". This new type packing is designated "Double U" because the wear wall and heel are doubly reinforced against wear on the contact leg and against pinch clearance between from excessive plunger and gland ring.

It is claimed that the Davies' patents mark the first improvement in the process of making leather "U" packings since Bramah made his famous

"Collar" in 1796.

# FOR BETTERON

When you buy a Marshalltown Press, you get a press that is designed and built for extreme dependability, and a press that is an outstanding value. Features of design include more die space, chrome nickel cranks, wrist pin connections and many other proven advantages.

Write today for literature about Marshalltown Presses — available in capacities from 5 to 70 tons.



NO. 5 FLYWHEEL TYPE

MARSHALLTOWN MFG. CO.
900 E. NEVADA ST., MARSHALLTOWN, IOWA

# HART'S MILLING FIXTURES



These fixtures will make themselves popular and profitable in your shop. They are easily kept clean to receive the work and may be used in either horizontal or vertical position. Suitable to hold round, hexagonal, octagonal, or equare stock, aligning the work with the machine. A very easy setup and fool proof, with a grip that holds the work on the bottom as well as on the back. Shipped in pairs, unless otherwise ordered. We can also supply dividing heads to be used with the fixtures. Write for descriptive circular.

### HART MACHINE CO.

26 Mather St.,

Dorehester, Boston, Mass.

# The Bright Spot IN PRODUCTION OF STEEL PARTS



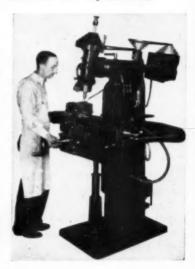
KENNAMETAL (The Steel-Cutting Carbide)
Unequalled in the machining of forgings, bar stock
or castings of carbon, alloy or stainless steels, also
Monel metal and malleable iron • Cuts two to six
times faster than high speed steel • Requires less
down time for re-grinding and re-setting tools
• Roughs and finishes in one cut • Takes interrupted cuts without breakage • Machines unannealed stock heat-treated up to 550 Brinell.

IMPORTANT!
KENNAMETAL tools cost no more than ordinary
carbide tools—see our new price schedule.



### Midway Improves Millmaster

De Luxe Model Millmasters, of which the regular model was announced in the August issue, are now available, incorporating a number of important refinements and improvements.



The De Luxe Models include a number of accessory units without extra cost. Of these, a center or third pulley attachment and table power feed is now provided as regular equipment—being sold separately for the standard models.

This unit provides power feed to the table on longitudinal travel only. A ¼ h.p. 3-phase motor is utilized and affords seven speeds with stop-start-reverse.

Standard and De Luxe models are now furnished regularly with motor driven vane pumps and storage tanks for coolants or cutting compounds. These units fit in base and provide a constant supply of compound directly to the work. Gravity returns liquid to tank.

# KALAMAZOO METAL CUTTING BANDSAW



Plus Value

- ★ Enclosed dirt-proof gearing sealed for life.
- ★ Hydraulic frame control.
- \* Quick acting vise.
- \* Automatic cut-off.
- ★ Standardized parts throughout.

Kalamazoo T. & S. Co., Sola Harrison St., Kalamazoo, Michigan

Indexing head and tail stocks are available for all models at extra cost. Also vernier attachments are useful extras for precision work. These latter comprise vernier scale and vernier plate reading in .001" longitudinal scale, 24" long; traverse scale, 12" long.

Special end mill holders for heavy duty milling are available for all models, instead of collets as standard equipment, or obtainable extra as accessory equipment.

**JACKSON-HIGH SPEED** 



## Vertical Drilling and Boring Machine

This machine is specially designed for High Speed Precision and Production Milling and Boring pockets, slots, angles, and compound angles up to 90° without disturbing the work in the machine. Rigidly constructed of best materials to prevent vibration.

of table 8"x24". This is not just "another" machine. It merits your investigation. WRITE TODAY.

JACKSON MACHINE & TOOL CO.

Length of table working size has been increased from 26" to 38". Net weight has been increased from 1600 to 1800 pounds.

Another extra is a rapid rack table feed model for die casting or other special uses, providing extra rapid longitudinal feed with hand wheel.

Table swivel vises with graduated bases and 4½" or 6½" jaws are available as extra accessories.

Millmasters are made by Midway Machine Co., 2324 University Ave., St. Paul. Minn.

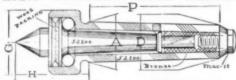
### **Chamfered Machine Screw Nuts**

Manufacturers Screw Products, 222 W. Hubbard St., Chicago, Ill., announces that they now regularly furnish all machine screw nuts chamfered on both sides. This processing is said to turn out a product as fully finished as a milled nut—a better appearing nut, free from burrs and easier to use since it now makes no difference which side is up.

Stock is regularly maintained in steel and brass, plain or plated in cadmium and nickel finish. Other finishes can be had on very short notice. Sizes from 2-56 and up. Package stock from a gross on up to full container kegs are available for immediate shipment from stock.

They also have a series of novel mailing pieces, of interest to users of unusual screws or washers as well as a new 40-page illustrated catalog of screws, nuts, bolts, lugs, washers. pins, etc.

# RIGID RESILIENT BULL CENTER



Rigid Tool Holder Co., 2,000 Witherell St., Detroit, Michigan

A disappointed buyer is slow in paying for his disappointment; while we have never yet, lost a dollar, on a purchase order; or a customer that we know of; and seldom send out a "Please remit". But we are real cranky, about good work, and good material. The best is none too good. Excellence in Designing and Manufacturing is Excellence in Advertising.

All Morse tapers carried in stock.

# ADEQUATE and ADROIT

Adequate is the word that sums up the character, capability and come-throughness of the



# **CONWAY CLUTCH**

Power, overload, sudden shocks, teasing touches, full engagement, dragfree release are things which provoke championship caliber.

Adroit is the word which best expresses the functioning and performance of the Conway. A touch on the con-

trol lever, delicate or deliberate, brings a response—straightway and dependable—at the prime mover of your machine.

Get acquainted with the handsome and capable power pilot.

# The Conway Disc Clutch

Have you Conway bulletin P-24, L-28, and XYZ-L on Disc Clutches, S-10 on Overload Release and Slip Clutches, 36A on Compression Clutches, K-32 on One-Revolution Clutches, E-8 on Expansion Clutches?

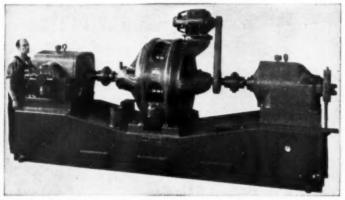
Patented in U.S.A. and Canada

THE CONWAY CLUTCH COMPANY
1541 QUEEN CITY AVENUE, CINCINNATI, OHIO

## Oilgear Two-Way Variable Displacement Pumps

Two - way, three - position, electric controlled variable displacement pumps are now being manufactured in conventional sizes from 2 to 150 h. p. by The Oilgear Co., 1310A West Bruce St., Milwaukee. Wis.

the pump control mechanism and for auxiliary purposes; a built-in relief valve for the gear pump; dual builtin reverse flow high pressure adjustable relief valves which protect machine and pump against overload; two-way



These new heavy duty, radial, rolling piston pumps, utilize a high-grade of oil as the fluid power medium. Practically each size is available with internal pumping mechanisms for normal working pressure ratings of 1100, 1700 and 2500 p. s. i. and for peak pressures up to 3000 lbs. All are arranged for flanged mounting to a separate reservoir base, or reservoir integral with machine. Built - in auxiliary gear pumps are provided for super-charging the high pressure unit, for operating

automatic suction and discharge valve flanged integral with pump case and flanged pipe connections.

With the compact, integral control on "DX" pumps, it is possible to reverse direction of oil flow and also select the neutral position at will from a remote pushbutton station, or by means of switches. Two opposing solenoids mounted on pump control, operate a built-in pilot valve. When one solenoid is energized, a preset volume of



Here's how to get real value from your grinding wheels. Dress and true them regularly. Use Vincent Improved Huntington dressers equipped with Vincent high-carbon tool steel cutters. Your mill supply distributor can supply them, and they cost no more than the ordinary kind.

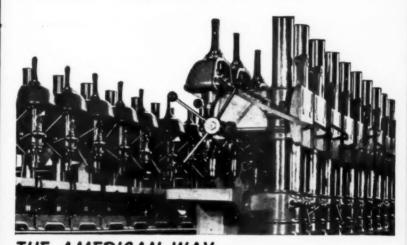
Insist on the dresser with the aluminum finish.

Write for descriptive catalog sheets.

THE VINCENT STEEL PROCESS CO.

2434 BELLEVUE AVENUE

**DETROIT, MICHIGAN** 





Rigid inspection of every Walker-Turner machine, coupled with precision manufacture, provides long service-life and operating economy.



## BY PRODUCTION METHODS!

Years ago Walker-Turner sensed a demand for moderatepriced, well-built machine tools for thousands of jobs that would not justify the expense of high-priced, "handtailored" machines. By the same production methods used by the American Automobile Industry, this Company took machine tools out of the social register and put them by the thousands in manufacturing plants throughout the country. We believe it would pay you to find out if these machines would increase your manufacturing profit.

### WALKER-TURNER PRODUCTS

DRILL PRESSES . METAL-CUTTING BAND SAWS . RADIAL CUT-OFF MACHINES . BENCH GRINDERS . FLEXIBLE SHAFT MACHINES . AND OTHER MACHINES FOR WORKING METALS, WOOD AND PLASTICS



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WALKER-TURNER CO., INC. 770 Berckman St., Plainfield, N. J. Send me the new Walker-Turner catalog.

SEND FOR INFOR-MATION NOW!

Nome-	Title
Сотропу	
Street	

PLASTICS WOOD

## Oil-Hole Drills Work Perfectly with Universal Collet Chucks...



Universal Collet Chucks grip shank or flutes of drills (plain or Oil-Hole), end mills, keyway cutters, etc. as strong as solid steel.

UNIVERSAL Engineering Company Frankenmuth, Mich.

oil is discharged in one direction. When both solenoids are de-energized, the pump slide block moves to neutral position and no oil is delivered. Hand control adjustment provided on each side of pump permit operator to preset the volume of oil to be delivered in either direction from zero to maxi-Since the flow of oil is reversed in the pump, no external control valves are required and installation is greatly simplified. For example, when pump is used in combination with a double acting cylinder on a hydraulic press, only two pipe lines are necessary to connect pump and cylinder.

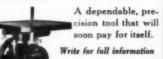
Six "DX-10025" pumps were recently built for operating large high speed speed presses. They were mounted on a large reservoir base and direct connected to 75 h. p. motors. Oil delivered by these can be varied from 0 to 16,500 cubic inches (71.4 gallons) per minute in either direction at peak

pressures up to 3000 p. s i.

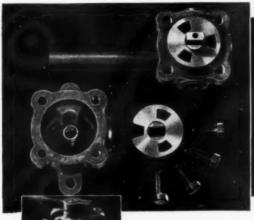
An Oilgear Type "DX-15025" is shown in combination with "C-15025" pump on a large reservoir base and direct connected to a double-end 250 h.p. d.c. motor. These units provide a combined delivery of 50,000 cubic inches (216 gallons) of oil per minute at peak pressures up to 3000 p. s. i. for operating a 150 ton high speed hydraulic deep-drawing press, having a 60" stroke.

Since Oilgear Type "DX" Pumps are especially adapted for remote, push-button control and greatly simplify the oil circuit and piping, they are being used as standard equipment on all styles of Oilgear broaching machines.

## \$25 BUYS A POSTEL



The Postel Filing Mch. Co. 915 Washington Ave., So. Minneapolis, Minn.



NOPAK
AIR CONTROL
VALVES
engineered to
improve with
use!

## NOPAK FEATURES

- No Air Loss thru Valve Leakage
- Packless Construction

  —no maintenance
- Pressure Sealed
- Protected, wear-proof disc and seat
- Quick or throttling action, as desired
- Full pipe area thru

Write for Bulletin 65.

#### Simple, Rugged Design for Efficient, Satisfactory Service

THE NOPAK patented, flat-disc principle results in highly simplified design, rugged construction, no wearing parts! The flat bronze disc is ground and lapped to make a perfect seal with the seat. This exclusive NOPAK feature continued the uniform "lapping-in" process while the valve is in operation. The result...absolutely leakprood sealing surfaces that actually improve with use!

The packless stem assembly positively preventair or pressure loss through stem leakage . . . eliminates packing replacement, maintenance service and expense.

Simple, rugged. Packless, Flat-Disc construction is the basic patented feature embodied in all models of NOPAK Valves. It is your guarantee of long-lived, low cost, trouble-free valve operation whether you specify NOPAK Valves for Air, Gas, Oil or Water — or for heavy Hydraulic Service.

GALLAND-HENNING MFG. CO.

2754 S. 31st STREET MILWAUKEE, WIS.



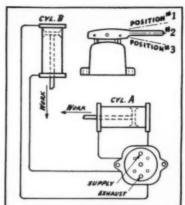
#### **Hunt Develops New Air Valve**

C. B. Hunt and Son, 1853 East Pershing St., Salem, Ohio, have developed a new double four-way hand-operated air valve suitable for control of two individual double-acting air cylinders with only one valve.

This valve has many industrial possibilities on air operated clamps, fixtures, knives, or any application where it is necessary to have one point of control for two cylinders that lead and lag each other in their respective actions.

The sketch illustrates a conventional hook-up to two double-acting cylinders, where the work stroke of the first cylinder (A) advances before that of the second cylinder (B); and the return stroke of cylinder (B) is completed before the corresponding stroke of the first cylinder (A).

Economies in piping, saving of air, and positive control of two cylinders with one valve are assured with this new "Quick-as-Wink" double four-way air valve.



WORK STROKE OF CTL.A	OPER	ATING C	YCLE
PRECEDES WORK STRONE	MANDLE POSITION-	CYL. A	CYL. B
OF CYL. B . RETURN	1	RIGHT	UP
THAT OF CYL. A. LEADS	2	LEFT	UP
/ mm/ DF 475.76.	9	1000	(Barrer to

## SAVE FINGERS



You can stop press mishaps at the source by controlling the human element—forcing the men to keep their hands out of the danger zones with the new

#### MODERN SAFE--T--GUARDS

Available in a broad range of types and sizes for all kinds of presses, they are easily attached. Automatic in action, the swinging guard pushes the hands gently out of the way of the descending ram. Simple and sturdy in construction. SAFE-T-GUARDS can be depended upon to protect your press operators. The re endorsed by many large users of power presses—by factory and insurance inspectors.

Let us tell you all about them—also about Modern Motor Drives for all machine tools.

- QUALITY-HARDWARE & MACHINE CORPORATION

5849 N. Ravenswood Ave.,

Chicago, Ill.

#### **Drill Press and Center Grinder**

Dalzen Tool & Mfg. Co., 511 Leib St., Deroit, Mich., offers a combination center grinder and drill press featuring a prompt and easy change-over from center grinder to drill press or vice versa.

To convert the machine into a drill press, the operator simply loosens one bolt, raises the dresser up to its full height, and swings it out of the way. This gives him a sturdy, accurate mastandard drill press alone.

These center grinders, of ½" capacity, are reported to have been used successfully in Detroit shops for a number of months past. They are designed to dress the angle accurately so as to provide accurate grinding and successive operations.

The floor type machine can be furnished in any length and is complete with motor, diamond and grinding wheel. It has four speeds, V-belt drive and will handle a wide range of work.



## SPECIAL CULLMAN DRIVES



Cullman builds Drives for Special Machinery as well as Standard Machine Tools.

May we quote on your requirements.

#### CULLMAN SALES CO.

NEW YORK TRIBUNE BLDG.

DETROIT 1782 KALES BLDG.



SUPER LIGHT ON A "SUPER-

DOALL"

Continental Machines, Inc., has equipped

its new "Super-DoAll" band saws with VIMCOLIGHTING. This localized. high intensity light is the assurance of even greater efficiency. attached, VIMCOLIGHTING can prove its worth on your machines.

#### Sterling Gear and Bearing Lubricant

A new lubricant for highly loaded gears, and anti-friction bearings of the roller and ball type, for use under extremely severe operating conditions, has been announced by Sterling Motor Truck Co., Inc., Milwaukee, Wis. Adoption of lubricant which consists basically of colloidal graphite suspended in a straight mineral oil, has followed on its successful use over a number of years in its six wheel dual chain drive models used for mine stripping, dam construction, stone quarrying, and other extremely severe types of operations.

The lubricant was found to prevent

metal to metal contact when pressures were extremely high, both in the case of differential and final reduction gears. as well as reduction shaft roller, drive pinion roller, and outer jackshafts ball

bearings.

The design of the differential housing in these units has been worked out in such a manner that all these parts are directly lubricated, eliminating the necessity for independent lubrication.

Experience over a period of years, according to Sterling, has shown that the "diag" graphited lubricant pro-vides the necessary initial lubrication during the run in period-a factor of considerable importance due to driveaway considerations when trucks are frequently driven at higher than recommended speeds.

Ability of the lubricant to resist heavy loads is attributable primarily to the fact that the colloidal graphite, under pressure and friction, forms a graphoid coating on gear teeth, ball and roller races, etc., this coating becoming integral with the surface of the part. Under extreme pressures. when the film strength of the petroleum lubricants is inadequate to maintain continuous lubrications, the graphite coating takes over the job of preventing metal to metal contact through a form of 'dry' lubrication. The colloidal graphite particles in the lubricant are extremely fine (maximum size 4 microns), assuring continuous colloidal suspension and effective "covering" properties.

## TURNER GEAR BOX DRIVE for BROWN and SHARPE AUTOMATIC SCREW MACHINES

This drive can be furnished for sizes 00, 0 and 2—both standard and high-speed types (six sizes in all.) Very compact, quiet and efficient individual drive. Six speed silent sliding gear transmission built especially for Brown and Sharpe Screw Machines. Quick change of pulleys gives unlimited speed range. Anti-friction bearings throughout. All-steel, heat-treated gears running in oil. Can be installed without drilling in one hour.

Built for lathes, shapers, radial drills, turret lathes, vertical mills, etc.

## DEALERS

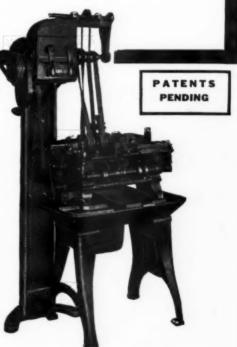
Write for prices and literature!

### USERS

See your dealer or write for full facts!

## THE TURNER UNI-DRIVE CO.

1638 Central St., Kansas City, Mo.



#### The Hobart Junior "Streamliner"

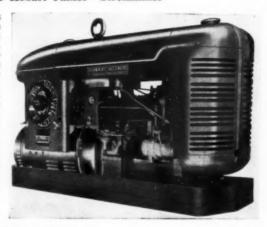
A new 200 ampere gas driven welding unit is offered by The Hobart Brothers Co., Troy, Ohio. Known as the "Streamliner," it is as attractive in outline as the latest car models.

Sturdy yet compact, the generating unit is thoroughly protected from the weather.

The engine is of rugged design and has a displacement 132.7 cubic inches, providing the power for full welding capacity at the conservative operating speed of 1500 r.p.m.

Self - starting, merely by pressing a bottom, the modern starting - lighting-ignition

the modern starting - lighting-ignition equipment includes a standard 6-volt battery and charging generator—elim-



inating hand cranking and magneto ignition.





## Non - Chattering . . . Bypass Piston Type Oil Relief Valves

An important use of these modern valves is in connection with oil hydraulic pumping units, where a specific pressure is required to be maintained, especially on machine tool hydraulic mechanism, oil burning equipment, rams, presses, etc.

The cylindrical piston closes off the port in a shearing manner and does not seat abruptly against body of valve, thereby overcoming any pounding or chattering noise, ordinarily encountered with standard valves using disc seats.

They are made in pipe sizes from ¼" to 2" and are suitable for pressures from 0 to 350-lbs., with a change of but five different springs for the pressure variation (state pressure required when ordering).

Bodies may be of cast iron or brass and can be supplied with brass, hardened steel or stainless steel pistons.

Where fuel oil is used, we recommend a brass valve with stainless steel piston, due to the fact that fuel oil contains a certain amount of condensation and foreign matter, and a harder, non-corrosive piston is required.

FULFLO Valves require no attention after being installed and set for the required pressure.

The FULFLO Line also includes Certrifugal Coolant Pumps.

May we send you bulletins?

THE FULFLO SPECIALTIES CO., INC. BLANCHESTER, OHIO





## LUFKIN CHROME FACE

Jet black markings on the Satin Chrome surface are easy to read even in poor or artificial light. The smooth chrome surface won't rust, crack, chip or peel. That's why you should own a new Lufkin Chrome Face Steel Tape.

WRITE FOR FREE CATALOG

THE LUFKIN RULE CO.

SAGINAW, MICH: . New York City

The makers emphasize that a separate exciter gives "hot start" advantages with freedom from "arc blowout" with the continuous welding performance typical of the Hobart Senior models.

They also call attention to the generous capacity—to the multi-range control, and other advanced features, found in other equipment in this line.

Close heat control is provided by the multi-range generator control and the vari-speed engine control — within range of the generator, giving the required arc temperature to the fraction of an ampere.

1000 voltage-amperage combinations are claimed for the dual control, providing any desired current (heat value) with high, medium or low open circuit voltage, providing the right combination of voltage and current for the electrode. Reverse or straight polarity is available at the flip of a small switch. Remote control provides correct welding values for all welding positions, without need of a helper and without necessity of operator leaving the work.

The makers assert that the Hobart arc automatically stabilizes itself to give best results. Fewer interruptions mean less chances for porosity and weak spots, as well as smoother, more continuous welds.

Full details are given in a new bulletin.



## THERE'S A HILLIARD CLUTCH FOR EVERY JOB... Over-Running—Friction—Single Revolution—Slip-Special THE HILLIARD SINGLE REVOLUTION CLUTCH

An automatic clutch for intermittent and positive drive. Especially valuable for cutting or punching operations, packaging machinery, etc. Simple trip makes it suitable for mechanical, electrical or manual control. Write for booklet giving full information.

THE HILLIARD CORPORATION - 126 W. 4th St., Elmira, N. Y.
Chicago Office, 201 North Wells St.

HILLIARD CLUTCHES • ELMIRA, N. Y.

#### Chicago Pneumatic Streamlines Compressors

A new bulletin (No. 75) introduces the new streamlined portable compressors developed by Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.

Printed in two colors, with a handsome varnished cover, the 28 pages are devoted to a detailed analysis by word and picture of the features of the different models.

Of particular interest is an entirely

new Diesel driven model in the 500 cu. ft. size. It is trailer mounted on steel or pneumatic wheels for ready portability.

Magnetic Disc Brakes

The Stearns Magnetic Mfg. Co., Mil-waukee, has issued a twelve page Bulletin No. 604 on the subject of Stearns magnetic disc brakes, a very comprehensive treatise on the subject, containing complete description, specifications, formulas, installation views and other information valuable to users and prospective users of magnetic brakes.

# AND HIGH COST WITH THIS ROUSSELLE PUNCH PRESS

Now you can have all the advantages of the small press with every safety feature of the large.

This small Rousselle Press knocks out High first cost, High production costs, High power costs, Wasted floor space and inefficiency.

It also has the punch and stamina of a large press, being able to knock out 10,000 operations per hour. All of this can be accomplished with no danger to the operator.

Features like Rousselle's Safety Automatic Knockout Bar, and non-Repeating Clutch, are safety devices usually found only in larger presses. Yet why waste time and money by operating large presses, when Rousselle will handle small jobe quickly and efficiently?

Write today and learn how you can save on operating costs.

DAVID J. ROSS CO.
BENTON HARBOR. MICHIGAN

#### **Eliminating Grinder Dust**

Unique facilities which make it possible to grind and sand castings within a few feet of precision machining operations, have been installed in the new addition to The Monarch Machine Tool Co., at Sidney, Ohio.

By means of the same type of downdraft ventilating system recently in4-ft. in diameter. In order to catch the grinding particles in the bucks, these units are protected by sheetmetal guards as shown.

In the small-castings paint department are two 4 x 8 ft grilles. Spray paint particles pulled down into these grilles are carried away by means of



stalled for spray painting of completed lathes, castings are now being ground, spray painted and sanded at one end of the machining building without any walls or partitions of any kind.

There are 14 working stations—11 for small castings, 3 for lathe beds and other large castings. The top of each unit is a large grating, through which air is exhausted to pull away the mist of rust, sand and other fine particles. With the gratings for the large castings located on the floor and those for the small castings at 16, 20 or 32" levels, the men are never in a position to inhale the dust or fumes, nor do they ever have to work in a bent-over position.

Units in the grinding section include a 2-wheel snagging grinder, a surface grinder for castings up to 4-ft. square, and four grinding bucks. the largest water solution and eliminator packs located underground. The equipment in the sanding department includes four grilles each 5-ft. square. Here a water vapor is used in connection with the blower fan to eliminate the sand particles in the form of sludge.

To facilitate handling of the large castings, the three floor stations are connected by means of a 54" track. Riding on a dolly, the heavy castings are moved from the receiving department through the grinding, painting and sanding operations to the machining department, without further lifting.

All units are exhausted through the roof. The two painting outlets are carried 30 ft. into the air to prevent fumes re-entering the plant through the monitor windows. The total amount of air removed is 50,000 cu, ft. per minute at an average surface velocity of 20 ft. per minute.



## Equip Your Machine Tools with Berkeley Drives and Be Ready

Berkeley Drives will prepare your plant to meet the present day requirements of industry. Older machinery can quickly be converted into modern up-to-date production equipment.

There is no machine in your plant that we cannot efficiently motorize. We manufacture a drive suited to your requirement. V-Belt—Helical Gear—Variable Speed (P.O.S.)—or Quick Change Gear Drive. Each Drive is custom-built to your particular machine. This is accomplished by the Arc Welded Steel Bracket Construction.

Enthusiastic users report the unusual savings and increased production on Lathes, Grinders, Automatics, Shapers, Millers, Presses, etc., that have been motorized by Berkeley.

Let us help you prepare. Write for details today.

THE BERKELEY EQUIPMENT CO. PENNSYLVANIA

### Standard Buffing - Polishing Machine

The Standard Electrical Tool Co., 1954 W. 8th St., Cincinnati, O., offers a new infinitely variable speed buffing and polishing machine. The correct speed for each operation is always available, using any size or type of wheel. Longer wheel life and more efficient production follow. with an additional saving in that worn wheels can be used longer.

Speed change is accomplished by turning hand wheel on top of machine. Each change of spindle speed is shown in r. p. m. on indicating dial at front, and while the full speed range is 1000 to 3500 r.p.m., any intermediate speed may be had.

All of the equipment, including speed changer, constant speed 1800 r.p.m. ball bearing motor and magnetic starter, is enclosed inside the substantial base. while the push button station is at the



front. Removable louvered covers at sides and front provide easy access.

Features of construction include high grade nickel steel spindle, with hard bronze spindle nuts, four heavy duty ball bearings and liberal oil reservoirs.

## Airplane Wing Parts Held in Position for Welding!



Another application for De-Sta-Co, quick-acting toggle clamps, the efficient method for holding parts during production, as for welding, drilling, reaming, machining or assembly operations. Many large plants now standardize on De-Sta-Co clamps; hundreds of small shops use them regularly. Complete line, all sizes. Send for Bulletin No. 40-illustrates clamps and shows uses.

## DETROIT STAMPING CO.

Established 25 Years

3400 West Fort St.,

Detroit, Michigan

## Air-O-Chek Leakproof Air Valves

QUICK, SURE ACTION — Saves time—Avoids production delays.

LEAKPROOF-Saves air.

EASY TO USE—Operators like it. SIMPLE DESIGN — Low maintenance. PATENTED DESIGN — Enclosed actuating lever operates valve through ball and socket joint. Gives full air discharge with slight flex of hose.

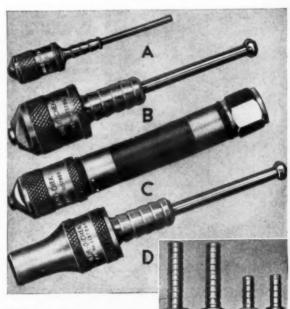
No packing gland to leak. Streamlined — no protruding levers or buttons.

A & B. Model A Air-O-Cheks for permanent installation on the hose. Sizes for 18, 14, 16, 34, 16, 34, 18 and 34" hose.

C. Model FA Air-O-Chek—detachable—furnished with either male or female Pipe Fitting in 34, 34, and 36" sizes.

D. Model A Steel Nozzle Air-O-Chek. Sizes for %, ½ and %" hose.

Made to precision standards of solid bar stock — brass and stainless steel.



THOUSANDS IN USE in leading automobile and aircraft factories, machine shops, foundries, steel mills, textile plants—wherever compressed air is used for blowing.

Try an Air-O-Chek. Discover new efficiency, convenience and economy. Order sample on approval.

Air Hose Fittings of Bar Brass with standard pipe threads. E has extra long shank—F has normal length shank.

AIR-WAY PUMP & EQUIPMENT CO. - 401 S. Jefferson St., Chicago, III.



### TANNEWITZ Ahrasive Cut-off Machine

Uses Abrasive Wheels or Saws, and instantly swivels and cuts any angle from 450 left to 450 right, doing clean, instantaneous work on metal bars, shapes or

THE TANNEWITZ WORKS Grand Rapids, Mich.

Standard Since 1911 INCLINABLE POWER PRESSES LOSHBOUGH-JORDAN TOOL 2 MACHINE CO. 1625 STERLING AVE ELKHART INDIANA

with visible oil supply. A shaft lock is also provided for changing wheels.

Units are available in 3, 5 and 71/2 h.p. types, with larger sizes furnished The straight front pedestal to order. permits wheels to extend beyond machine proper, allowing ample freedom of operation and foot room. Illustrations and full details are given in a new bulletin.

### Cleaning Brass for Plating

An improved method for the electrocleaning of buffed brass, bronze and other copper alloys is announced by Oakite Products, Inc., 22 Thames St., New York, N. Y. Data is being re-leased to the trade through Service Representatives. The method should interest to executives in charge of plating departments where either bright nickel, chrome, cadmium or other plating finishes are applied to brass, bronze and other copper alloys.

Said to eliminate the necessity of a cyanide dip and a copper strike before bright nickel plating, the new method, known as the Oakite Oxbrite Process. makes possible, in addition, the bright nickel plating of soft soldered work without preliminary copper plating.

Another important feature claimed for the method is assurance of freedom from peeling of electro-plated deposits caused by inadequate preparation of the surfaces. Because it effectively removes all soap films and metallic deposits and also prevents surface embrittlement, the method provides much finer adhesion, so that bright, lustrous, uniform electro-plated deposits are obtained



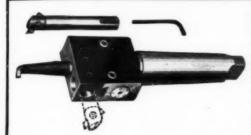
BUTTS AND CONTINUOUS LENGTHS - for GUARDS - CABINETS - CASES - BOXES - LUGGAGE WRITE FOR CIRCULAR

MACHINE WORKS

HARDWARE DIVISION

CHICAGO, ILLINOIS

ASSO WEST LAKE STREET



## MASTUR Precision BORING HEAD —

No gib, perfect adjustment, direct reading in thousandths, Vernier reading in two-tenths of a thousandth. Every working part adjustable for wear.

#### 3 SIZES

No. 5—Bering Capacity 7\*,....\$37.50 No. 6—Bering Capacity 11\*,... 65.00 No. 7—Bering Capacity 15\*,.... 90.00



MAXWELL



Grooving, Recessing, Back Facing. Pilot is ball bearing. Will not gauld or tear hole. Operation almost instantaneous. Made in three sizes.



E-Z SET BORING TOOL

Adjustment actuated by a worm. Made in three sizes.





MAXWELL Precision Grinders

1/4 to 3 H. P.

Also Grinder Spindles to fit your machine.

Internal or External. Internal Spindles up to 24" long.

Send for individual descriptive circular.

F. A. MAXWELL COMPANY

300 S. BROADWAY

:-:

BEDFORD, OHIO

#### Chain Driven Machine Tool Transmission

Chain drive may be adapted readily to machine tool transmissions as illustrated in the installations of Morse chain driven Western transmissions on production lathes.

The advantages of this type, pointed out by Morse engineers, in addition to their latest practice of more sprocket teeth and a higher lineal speed to ac-

## STOP LOSSESI



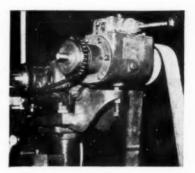
## INSTALL STALL STALE SPEEDSHEERS OF INDUSTRY)

Productimeter counters record accurately machine output . . . running time . . . idle time, and operating costs. They count strokes, revolutions, lineal units, bottles, cans, packages, etc., either mechanically or electrically, with no chance of error . . . there is a model for each industrial need.

Write for Complete Details Today!

### DURANT MANUFACTURING CO

1938 N. Buffum Stree Mulwaukee Wis 180 Eddy Street



complish virtual silent operation, are:—
(A) Positive speed ratio, insuring accuracy of final speed governed by the transmission (B) Lessened bearing friction due to characteristic slackness of chain drive (C) Greater facility of changing speed ratio; this is done by changing one sprocket and adding or removing quickly detachable chain links.

For safety and appearance the chain drive is enclosed in a compact sheet metal guard with convenient drip-oiler cup. Occasional filling of this cup is all that is required for sufficient lubrication. Channel - lubricated bushings store lubricant within the joint.

With a completely adjustable bracket, Western transmissions may be installed on all types of machine tools such as millers, shapers, turret lathes, etc. and make practical almost any distance desired between centers of the shafts.

## for SENECA FALLS Automatic lathes WORK DRIVER

Self Centering... Quick Acting... No Slip. Attaches to any chuck plate or spindle. Provides a slip-proof, balanced drive reducing chatter. Handles rough forgings or turned pieces—straight or taper. Eliminates dogging time. Reduces tool breakage. Write for details and size range.

SENECA FALLS MACHINE CO., 314 Fails St., Seneca Fails, N. Y.

## QUICK DELIVERY! LOW COST!

The new Simmons Lathes feature the Micro-Speed Drive, an important fast-production asset. This Drive, contained in the cabinet leg, permits instant selection of an infinite variety of spindle speeds by the mere turn of a handwheel.

- -Timken Precision Spindle Bearings
- -Snap Levers for Apron Feeds.
- -Added Efficiency Under Heavy Loads

Simmons Lathes are manufactured in 16¹, 18¹ and 20¹ standard, 16¹, 25¹, 18¹ /27¹, 22¹/34¹, 20¹ /40¹, 26¹/40¹, and 28¹ /50¹ gap beds in all bed lengths.

**Complete Specifications** 

upon Request. Write today.



## MONS MACHINE TOOL

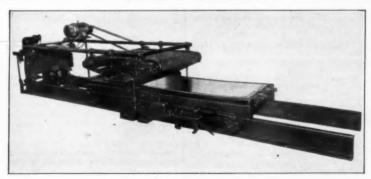
1725 Broadway, Albany, N. Y. Singer Bldg., New York City

### **Polishing Stainless Steel Sheets**

A new unit designated as No. 27-H. has been developed for the stainless steel industry by Excelsior Tool & Machine Co., East St. Louis, Ill. It should be useful in view of the expanding use

sive belt makers in any width and grit. Grinding belt speed is 3500 surface feet per minute.

Carriage travel is 58 lineal feet per minute, adjustable for any length sheet. operated direct from a reduction geared



of stainless. Standard commercial paper 16-ft. endless abrasive grinding belts, are used obtainable from abra-

motor. The sheet is passed back and forth the required number of times under the grinding belt. Grinding head



Designed for speed, accuracy and versatility, the Vernon 11" Shaper will handle work usually accomplished only by machines costing several hundred dollars more.

#### **OUTSTANDING FEATURES:**

- Variable drive provides infinite speeds ranging from 50 to 150 strokes per minute with no changing of belts or pulleys.
- Helical gear and pinion assure maximum smoothness and power.
   Universal table and 7s swivel vise with steel
- Universal table and 7° swivel vise with steel jaws.
   Front-end support for absolutely vibration-
- Front-end support for absolutely vibration less rigidity.

The Vernon 11<sup>8</sup> Shaper has automatic, easily adjustable cross feed; enclosed anti-friction thrust bearings for long life; hand-scraped ways; and alloy rockes arm. Motor, ½ h. p., 1,750 r. p. m., 60 cy. Bench model as illustrated or mounted on floor pedestal with fully enclosed variable drive. Ask for Bulletin.

The Vernon Line of Committee of

MACHINERY MANUFACTURING CO.

is then raised, carriage stopped at extreme forward travel, clamps released and finished sheet removed.

The clamping fixtures are positive and carriage cannot overtravel, preventing damage to grinding belts, or rubber covered pressure drum, on which any required pressure is applied by removable hand weights, for positive regulated pressure over entire width and length of sheet to be polished. Over-size dust proof ball bearings are used throughout.

Power requirements are 30 h.p., to operate grinding belt—2 h.p. to operate reversible carriage. Floor space occupied is 5 x 30 ft. Machine is 7 ft. high, and weighs 13,500 lbs. Standard sheet polishing capacity any width, length and gauge up to 48" wide, 144" long, No. 4 to 7 finish.

### Cleaning Paint Spray Booths

The Harris Soap Co., Buffalo, N. Y., has developed a spray booth coating that makes it possible to strip off accumulated waste paint, lacquer, enamel, etc., in sheets. No scraping is said to be necessary. The waste paint can be peeled off just like so much unpasted wall-paper.

The material, called "Boothcote," does away with old-fashioned ways of cleaning spray booths, such as lining them with kraft paper or cardboard to catch the waste paint spray.

Boothcote is easily applied to metal spray booth walls with any standard spray gun. It is literally "painted on" although only a very thin coating is required. When the waste paint builds up on top of this Boothcote film, it lays tight against the metal but does not stick to it so as to prevent its ultimate removal. As much as a halfinch thickness of paint can accumulate on top of the coating without the paint falling away from the wall of the spray booth. This characteristic of Boothcote makes it particularly useful to companies that do continuous spraying and who quickly build up waste paint accumulations on their spray booth walls.

#### Defense Byproducts

"A m e rican industry recognizes the need for defense rearmament and is actively and whole-heartedly cooperating with the Army, the Navy and the Advisory Defense Council. In my judgment it will do a job unparalleled in history of turning out the enormous quantity of defense equipment and supplies needed to make this nation a factor in the restoration of world peace."

Thus d i d Philip D. Reed, G - E Board Chairman, sum up our present situation.

Reviewing the many items which will be supplied by his Company, Mr. Reed further observes:— "If

inflation is to be prevented and American standards of living preserved, industry must at the same time continue to produce useful goods."

"To find ways of continuing the production of useful goods without impairing the defense program is a most important goal. It may involve the use of a plastic instead of steel—an unskilled operator instead of a skilled one, I am confident an invaluable byproduct of the defense program, and one that will play no small part in it,



Oil flow may be adjusted as desired, or completely shut off by adjustable needle valve. Modern, streamline, unbreakable bottle eliminates danger of broken glass in production.

## GITS BROS. MFG. CO.

1860 South Kilbourn Ave.

Chicago, Ill.

30 years of oil cup experience

will be the technological advances it will yield. As we succeed in stepping up production and sale of useful goods, we not only reduce dangers of wartime inflation, but we increase the national income and the national revenue.

"When the arduous task of tooling up is completed—requiring months, and not days or weeks, defense materials will stream from America's factories in amazing quantities. Thus may private enterprise creditably discharge its responsibility to the country.

### **Grob Improves Filing Machine**

Grob Brothers, Grafton, Wis., offer a new heavy duty continuous motion filing machine of streamlined improved design, known as Type FA-18.

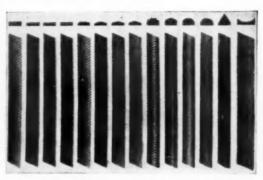
The machine has a throat of 18", but the same model with 30", 36" or larger throat is also available.

The machine consists of a one-piece heavy gauge welded steel frame. The ½ h.p. mo-tor and silent "V" belt drive are built into the

base. Three speeds, 80, 120 and 160 r.p.m. to the files, are provided. The tiltable table of box construction and heavily ribbed, is made of semi-steel and measures 20" x 20".

Files are attached to a chain, driven by a lower pulley having spring cushioned pins, providing a positive drive to the file-chain.

As the file-chain is extremely flexible, two pulleys of small diameter can be used in the upper arm as idlers and this has a double advantage The machine, in spite of the large throat, has a low total height and the file-chains are relatively short in length. the new machine, with a throat of 18", uses file-chains with 20 5" long files while the older model with one idler pulley and a throat of 12" only, uses



18 files or only two files less. Underneath the chain pulleys, channels are provided which facilitate inserting of file-chains.

On right side of base, a door provides



## PLUNKET IMPROVED VISES

Made Right-Work Right-Give Satisfaction

## Drill Press Vise

With Extra Lugs for Boiting Down No. 1—6" jaws, 11/4" deep, opens 5" wt. 35 lbs. \$22.40 No. 2—10" jaws, 21/4" deep, opens 81/5", wt. 90 lbs. 34.20

Prices are net f. o. b. Chicago. Dealers' inquiries are solicited. Write for illustrated folder today.

J. E. Plunket Machine Co., 1823 W. LAKE ST., CHICAGO ILL.

## BROACH and ASSEMBLE

standard styles and sizes—manually operated presses from  $\frac{1}{4}$  to 35 tons pressure—motor driven hydraulic presses from  $\frac{1}{2}$  to 15 tons pressure. Write for catalog F.



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Grind Your Drills On
"BLACK DIAMOND"

Precision Drill Grinder

BLACK DIAMOND TOOLS

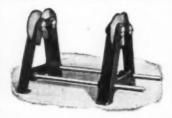


Even an unskilled operator can do a precision job of drill grinding—handles sizes from No. 60 wire gauge to 3/4"—easily, quickly and without any complicated adjustments. Saves time, drills and possible damage to the work.

Let us send you Bulletin No. 121-H.

BLACK DIAMOND SAW & MACHINE WORKS. INC. NATICK, MASS.

## =ANDERSON= Improved Balancing Ways



Equip your shop with this accepted method of balancing rotating parts—checking, straightening and truing operations.

Anderson Improved Balancing Ways are simple, sturdy and dependable. They save time, effort and trouble—assure better work.

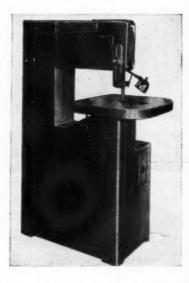
Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a prompt, sure indication of whether or not the work is in perfect balance.

Swing	Greatest Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000

Let us tell you more about this and other useful Anderson equipment. Your request will bring full details promptly.

Anderson Bros. Mfg. Co. 1907 Kishwaukee Street, ROCKFORD. ILLINOIS easy access to motor and driving mechanism. On inside of this door, a tool shelf is attached to store file-chains and miscellaneous parts.

The machine is completely guarded; no moving parts are exposed except where files are passing through the working zone.



A variety of files in types and shapes can be furnished. The files, manufactured by Grob Brothers, are made of a high grade alloy steel for exceptionally long life. Standard files are furnished in single or double cut; fine, medium, coarse, or shear cut. Special files are made to order. The files are extremely accurate in size, within .001" to .002" in thickness and width, and being securely guided through the working zone and positively driven, cut fast, smoothly and accurately.

Floor space required is 23" x 40". Total height is 60" and the net weight is 520 pounds.

## W LATHE CHUCKS



## 4 JAW INDEPENDENT L-W LATHE CHUCKS

Semi-Steel body, ribbed construction, hardened and ground steel reversible jaws—Made to stand the gaff. We are proud to offer such Hi-quality at low cost.

> 10<sup>s</sup> Size \$29.00 12<sup>s</sup> Size 33.50 14<sup>s</sup> Size 38.00 16<sup>s</sup> Size 47.00 18<sup>s</sup> Size 62.75

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Chicago Mounted Wheels made of the new V/T Super Bond prove by tests conducted in many plants on snagging and exacting operations to have from 150% to 300% longer life. They're tougher; can take more punishment; grind more pieces per wheel, faster and without sacrifice of cutting action.

V/T Super Bond holds its original shape longer. Wheel will not ridge on grinding welds, sharp corners, sinking dies, barbering, and other work of this character.

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V/T Super Bond meets the challenge of today's exacting requirements. Cuts your grinding cost. Let us prove it to you in your own plant on your toughest mounted wheel job.

Let us send you one of these Mounted Wheels without cost or obligation. Tell us the kind of job, type of equipment and size you want to use to make your own test.

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## FREE MOUNTED WHEEI, CHART

Ideal for ready reference in the shop. A Wall Chart 22x15", showing actual size and shape of every standard Chicago Mounted Wheel.

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V/T Super Bond is one of the most important developments in mounted wheels. Wherever the use of a tough, hard bond that will stand the gaff is required, V/T Super Bond will be found without peer. Nothing can compare with it in endurance, stamina and performance. There is a shape and size to handle every grinding job faster, better and at lower cost.

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The FIRST small abrasive wheels mounted on steel mandrels to be offered to industry.

The FIRST with this special new and exclusive bond — V/T Super Bond, unequalled in strength and long life.



## HI-POWER GRINDER

For jobs beyond the capacity of the Handee—nothing compares with the HI-POWER in vibrationless performance, precision accuracy and stamina. Speed 17,000 r.p. m. with ample power to drive a  $2\frac{1}{3}$  diameter wheel. Weighs 3 pounds. Comes in wood carrying case with 2 mounted wheels,  $1\times 1^8$  drum sander and extra sanding bands,  $\frac{1}{3}$  $^8$  collet,  $\frac{1}{3}$  $^8$  collet, wheches and dressing stones. \$35.00.

## **HANDEE TOOL OF 1001 USES**

Here's a small "power house" that can be carried to any part of the shop and used wherever there is an electric outlet. Repairs hard-to-get-at parts on machinery without removing the part—smooths off rough spots on dies and moulds—cleans delicate mechanisms—grinds, drills, polishes, cuts, routs, carves, sands, saws, sharpens, engraves, cleans, etc. Uses 300 accessories. There are more Handees in use today than all other tools of this type combined.

De Luxe model weighs 12 oz. 25,000 r.p.m. \$18.50 postpaid with 6 Accessories.

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Adjustable from vertical to horizontal position within a few seconds, the No. 608 Production Abrasive Belt Surfacer is capable of large output. It saves time burring, surfacing and polishing plastic moulded products, rubber, wood, pressed steel parts, die castings, iron, steel, etc. Ball bearing equipped throughout. Work or belt table is 15"x6". Abrasive belt is 50" long x 6" wide. Work gauge is adjustable to any angle and removable. Other sizes 4" to 20" width of belt. Vertical and Horizontal. Also Reed High Speed Sensitive Drills.

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## "JOHN'S" DRILL JIGS



Modern Production Tools for all Drill Press Operations.

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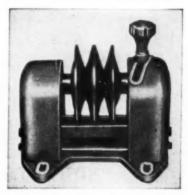
## DEARBORN Automatic Chucking and Indexing Fixture MILLS OVER 1000 PARTS PER HOUR

Work held by draw in collets. Collets open and close automatically. Work automatically ejected. Indexes without loss of time for milling 1, 2, 3, 4, 6, 8, 12 or 24 sided pieces. Minimum set-up time required. Speeds up production. Positive and accurate in operation.

J. W. DEARBORN 72 S. CLIFF ST. ANSONIA, CONN.

#### "All-Speed" Transmissions

A new V-belt variable speed transmission, known as the "All-Speed," is introduced to industry by the Standard Transmission Equipment Co., Suite 330, 416 W. 8th St., Los Angeles, Cal.



The speed selector operates on the variable pulley principle, and consists of two interlocking pulleys mounted on a common shaft. The variable speed spindle can be pivoted laterally between motor and driven machine to provide new running diameters on the interlocking pulleys.

The selected speed is maintained by a lock nut on the control quadrant. The oblique slot, which positively guides the spindle at all times is claimed to assure proper belt alignment. This distinctive feature is said to be especially advantageous when control unit is mounted vertically as for drill press mountings, etc. Special impregnated bronze bearings are used with forced lubrication provided at all times.

Three sizes are available for %", "A," and "B" belts, and in speed ranges up to 12-1.

## Hydraulic Shuttle Increases Broaching Safety

Use of an hydraulic fixture shuttle to increase ease of loading and unloading, with greater safety for the operator

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## HALCO UNIVERSAL HEAD

FOR HIGH SPEED
MILLING DRILLING BORING S ANGLE

PRICE \$195.00

With 10 Speed Back Gear

\$47.50 Extra

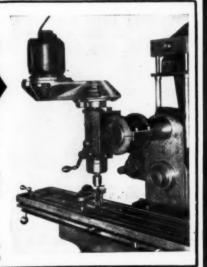
Sold direct, factory to you, or your nearest dealer. Many machines in use. Tried and tested in machine plants for 1-1.72 years. Each head is unconditionally guaranteed for six months.

Write for folder giving details or order now for quick delivery.

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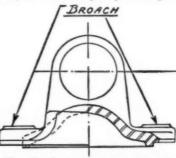
protected by our broad 5-year guarantee.

STEEGE Drives are easily installed prices \$35.00 up—sent on 30 days' approval. Let us send catalog.

W. L. STEEGE MACHINERY CO.

548 W. Monroe St., Chicago, Ill.

is a feature of a broaching installation now used at the Ford Motor Co.. for machining four bolt bosses at one time, on a universal joint yoke flange.



The shuttle is incorporated in the design of a Colonial Broach Co., (Detroit) 6 ton open side utility press and is synchronized, in operation, with the ram travel. At the end of the cutting



## Precision Drill Grinder



Simple to operate—dependable—speedy—this Precision Grinder will enable you to produce perfect joints on standard twist drills in sizes from No. 41 (.096) to %\* (.625).

Send today for more details.

Star Machine & Engineering Corp.

Division Star Electric Motor Co.

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stroke, the fixture and part are shuttled backward away from the broaches to permit unloading and reloading during the return stroke of the broaches.

The operation consists of rough and finish broaching all four bosses at one time, at a rate of approximately 150

pieces per hour. Stroke is 36" with a cutting speed of 30 feet per minute and return speed of 60 feet per minute.

The forged steel yoke flange is located in the fixture, from cross holes in the part and the front side of the flange, equalizers being used for the

With the set-up, ample clearance is provided between fixture and broaches, avoiding danger of injury to the operator's hands. The arrangement could permit continuous machine operation if desired. In actual practice however,

the cycle is as follows:

Start with dual safety control.
 Shuttle moves fixture and part into broaching position, automatically

3. Broaches rough and finish cut on down travel of ram.

4. At end of stroke, shuttle moves

back for unloading.

5. Unload and re-load while ram is returning to starting position.

Illustration shows shuttle (center part of fixture table) in broaching position and the drawing shows the parts being broached.

## DESMOND GRINDING WHEEL DRESSERS & CUTTERS



We manufacture the only complete line of Dressers and Cutters. Write for catalog and name of your nearest dealer.

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Canadian D. S. Mfg. Co., Ltd. Hamilton, Ont.



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under less tension is the distinguishing advantage of Sutton DIAMOND - GRIP Collets for screw machines. Their clean-cut diamond-shaped serrations prevent spinning, rolling or slipping by attacking operating thrusts at an angle . . . Equip with Sutton Collets and Feed Fingers to improve screw machine output.

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#### Electronic Devices for Industry

Since electrical engineers first put vacuum tubes "in overalls" a few years back, the industrial application of devices utilizing these tubes has grown so unobtrusively (and steadily) that it s quite surprising today to discover the number of such devices available and the extent of their use throughout industry.

A new 20-page booklet entitled:



Available in 10, 12, and 15 in. dia. Substantial and high precision. Write for new Gorton Accessories Catalog which contains complete information and prices.

George Gorton Machine Co. 1115 13th Street

RACINE. WISCONSIN

"Electronic Devices for Industry" (GES-2411), just published by Gen-eral Electric Co., Schenectady, N. Y. briefly lists some of the more important vacuum-tube apparatus and describes its application and method of operation An idea of the scope of the little pocket-size publication can be gathered from the fact that it deals with such a variety of devices as photo-tubes, d-c motor control, the recording spectrophotometer, exposure meters, pyrometers, gas-discharge and high-vacuum electronic tubes, the Reactrol system, automatic arc-welding equipment, ignitron rectifiers, resist-ance welding, and battery - charging equipment. Copies are available on request.

### Metal Congress and Exposition

The 21st National Metal Congress shows every indication of presenting such an outstanding collection of papers as to mark an epoch in the technical sessions of the American Society for Metals.

The cooperating societies also have their programs well advanced, the American Welding Society having 55 papers to present at their sessions, while the Institute of Metals and the Iron and Steel Divisions of the American Institute of Mining and Metallurgical Engineers and the Wire Association have planned extensive programs.

The American Society for Metals will have approximately 14 sessions besides the educational lectures in the late afternoon and early evening.

The National Metal Exposition promises to be the largest show that has



## The HAMILTON PORTABLE ELEVATING TABLE—"PORTELVATOR"

No strained backs or bruised fingers if you let the Hamilton "Portelvator" do the lifting for you.
Use it as means of support—Use it to level large overhanging pieces of work—Use it as a bench to work on—An economical and

efficient helper—One to twenty ton hand or power operated.

Write for full details today,

THE HAMILTON TOOL COMPANY B AND WAYNE STS.. HAMILTON, OHIO

## CENTERLESS GRINDER REST of COLMONOY

The wearing portion of this centerless grinder rest is a welded-on regress of COLMONON V. 6. applied to the base, after

For Maximum
Abrasion Resistance Specify
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overlay of COLMONOY No. 6, applied to the base, after which it is machined. On machine tool parts subject to great wear and abrasion such as lathe points, dogs, chip breakers, drill flutes, wire straightening shoes, thrust hearings, screw machine fingers, grinder feet fingers, forming and drawing edges, etc., COLMONOY No. 6 is effecting substantial savings due to its long life, ease of application, wear resistance and freedom from galling.

It may be cast, or applied as an overlay, using either gas or electric welding equipment. A trial will convince you of the savings made possible by this new COLMONOY development.



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Built with the usual surplus of essentials that maintain their high reputation for:

Strength

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Heavy duty transformer, horns, secondary, and steel cabinet construction.

Foot, Air or Motor operated units in 5 to 50 KW Ratings — Rocker Arm or Vertical Press construction.

BENCH MODELS Rated 2½, 5 and 7½ K.W.

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with the A.M. Sensitive Tapping Machine

. from the smallest and finest up to %s" diameter in steel and iron-and up to 4 in softer materials. A modern unit that within its

capacity, will take all the punishment intense production can inflict.

Write TODAY for this sure solution of your small tapping problems.

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**ELIMINATES** DIAMOND WASTE! DIAMOND For Dressing All Grinding Wheels Write for Catalog DR-38 CARBOLOY COMPANY, INC Y1139 E. 8 Mile Road, Detroit, Mich. Chic. - Cleve. - Newark - Phila. - Pitts. - Wercester, Mass.

ever been held in the long history of the Society. Over 235 exhibitors have reserved 90,000 square feet of exhibit space, and three extensions of the "space available" have been rendered necessary by the enormous demand for representation.

The theme of the Exposition will be "New Aids to Production." This is particularly appropriate now in the light of the tremendous activity in national defense and industrial expansion.

The Exposition is to be held in the Cleveland Public Auditorium concurrently with the National Metal Congress, Oct. 21-25.

### **Building Maintenance Handbook**

A new edition of the hand book of building maintenance is announced 2305 Manning St., Philadelphia, Pa.



phases of building maintenance-How to stop leaks-make feather - edge patches "stick" to concrete, how to patch roofs economically, -how to install floor grids.-and hundreds of other educational suggestions are included in its 74 pages and over 150 illustrations

The new hand book will be sent free to any responsible party requesting it on his business letterhead.

#### Aluminum Pistons and Cylinder Heads

A noteworthy new book on aluminum pistons and aluminum cylinder heads has been published by the Dynamic Laboratory of the Aluminum Company of America, Pittsburgh, Pa. Many illustrations of piston designs are given and their advantages explained. Piston Materials and Finishes are the titles of interesting chapters. The text is informative but non-technical and any user of pistons will derive benefit from reading this attractive little 48-page book. Copies will be sent on request.

#### Personnel

The European war, with its threat of spreading to this continent, following almost a decade of depression, brings American industry face-to-face with a serious skilled labor training problem.

Clifford S. Stilwell, Executive Vice - Pres., Warner & Swasey. points out that during the years of unemployment. the country's wealth of skilled mechanics was allowed to run down. During this period, skilled laborers of the 1920's passed their peak of productiveness. Many were lost through death and other reasons. Because there was no need. replacements were not trained.

Now suddenly, the demand for metal products is threatening to require more skilled mechanics than were available, even 10 years ago.

Industry, faced with this serious skilled labor problem can proceed along two fronts. Obviously, the first is training new men, who have had little or no previous experience. The second path is of tremendous potential importance and involves improving the skill or productiveness of the trained labor force already available.

Hours of those already working can be increased. New machines can be installed and these invariably have



showing washers on hand for immediate shipment, including a complete range of all standard sizes as well as hundreds of other washers in a great variety of special sizes. materials, and finishes.

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## WROUGHT WASHER MFG. CO.

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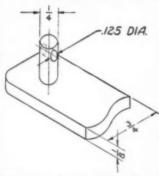
Milwaukee, Wis.

greater productivity. Along the same line in a smaller way, better tooling will help. Adoption of Carbide tools, which small-lot production shops are beginning to use on a wide scale, is a typical example. Man-power is the key to the situation for new machines are useless without operators.

The machine tool industry will supply the machines as rapidly as men can be trained to put them in operation.



## don't dri small holes



This piece was formerly drilled and burred at a cost of \$4.50 per M.

It is now being punched for \$1.50 per M. with the Durable piercing punches fitted into Durable patent intermeshing sleeves made special for this class of work.

The special vertically lapped and chrome plated punches used on this job average 10,000 holes per punch. The original set of special sleeves made for this job are still in use, and over 200,000 holes have been punched.

Write today for free hand book showing construction of many typical dies used by industrial leaders.

#### DURABLE PUNCH & DIE CO. 2224 W. Grand Ave., Chicago, III.

EASTERN OFFICE-1257 Commercial Trust Bldg., Philadelphia, Pa

#### Stanley Soft Face Hammers

A complete new line of soft face hammers has been developed by Stanley Tools, New Britain, Conn. These are for use on assembly jobs requiring hammers which will not mar finely finished surfaces or delicate machine parts.



The tips are made of "Stanloid." a tough, resilient, non-metallic substance. hickory handles are securely wedged in a steel center body.

Various shaped tips - regular face, ball pein, cross pein, straight pein, offset pein, square tip, and regular face with brass insert make these hammers ideally suited for mechanics, machinists, sheet metal workers, motor builders, service men, and for workers in defense industries. All tips are renewable.

#### **Ideal Insulation Former**

Plain or cuffed insulation of any length and up to 8" maximum width



## SPEED IS THE WATCHWORD

## ACME JIG BUSHINGS Speed up your tooling—

By releasing your men for more important work By being there when you need them

A.S.A. and Acme Standard bushings from stock. Special bushings made up on short notice.

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PRE-FINISHED METAL





Cut costs! Eliminate plating, polishing and lacquering operations with American Bonded Pre-finished Metals. Over fourteen different metals—in sheets, coils and round edge, flat wire. To prove the economy of pre-finished metal in your own plant, let us provide—free of charge or obligation enough of the pre-finished metal of your choice for a conclusive test. Write for complete details.



#### A COMPLETE LINE

CHROME ZINC NICKEL ZINC COPPER ZINC BRASS ZINC CHROME STEEL NICKEL STEEL Bright or Sating BRASS STEEL CHROME BRASS NICKEL BRASS CHROME COPPER NICKEL ALUMINUM CHROME ALUMINUM

Bright or Satin finishes Stripes, Crimpings, Corrugations. FOR MORE BEAUTIFUL PRODUCTS AT LOW COST



WRITE FOR FREE "TEST KIT" OF PRE-FINISHED METAL



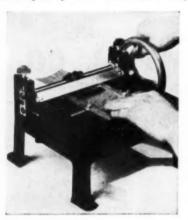
#### Get 2 for 1 with this new COMBINATION

### CENTER GRINDER & DRILL PRESS

To change from a Center Grinder which dresses the angle accurately and assures accurate grinding on successive oper-ations to a sturdy, accurate Drill Press— simply loosen one bolt, raise dresser up full height and swing out of way. Floor type, furnished in any length, complete with motor, diamond and grinding wheel. Four speed V- Belt drive to handle most any F.O.B. Detroit range of work. Write for Bulletin No. 10.

Dalzen Tool & Mfg. Co., 511 Leib St., Detroit, Mich.

can be formed with this new device developed by Ideal Commutator Co.,



1441 Park Ave., Sycamore, Ill. It makes neat fitting and uniform slot linings to speed up winding and prevent burned out armatures caused by winding being torn when coils are tamped into place.

The machine operates by turning a hand crank while insulation is accurately guided between a rubber roller and two creasing rollers by two aluminum brackets. The rubber roller protects the insulation and prevents the creasing roller from cutting through.

Any desired width of trough up to 11/2" may be obtained by adjusting the span between the two hardened steel creasing rollers. The creasing roller assembly is also adjustable for position of trough on insulation. Spring pressure between the rollers allows for different thicknesses of insulation.

Factory

The Nedca FILLER RUBBING MACHINE

Speeds Production! — Cuts Costs!

This New Nedco Filler Rubbing Machine has the correct speed. Economical, efficient, low in price, easy to handle, A.C. or D.C., weighs 7 lbs.-Truly a remarkable tool. Investigate TODAY-Do not delay.

THE NEDCO COMPANY 87 RUMFORD AVE. WALTHAM, MASS.

#### Color Blindness

Due to the foresight of U. S. Military authorities, new color blindness tests have been prepared which will make this country independent of Germany and Japan - principal sources of previous color percep tion tests.

The new tests will supplant the Ishihara test printed in Japan and the Stilling system of Germany.

The new compilation, which will be distributed by the American Op-Co., tical South bridge. Mass., incorporates the best of these foreign tests, and adds features leading to the detection of persons who do not wish to pass a testalso those att o tempting

conceal their condition.

It is estimated that color blindness occurs in from 3 to 4% of men, while only about 0.3% of women are afflict-It occurs as a congenital defect ed. and as an acquired affliction.

The new test charts are composed of patterns (figures, letters, etc.,) made up of variously shaded dots of the primary colors, set on differently colored backgrounds of similar dots in confusion colors. While a normal person easily

WE INVITE YOU TO CHECK THESE FACTS

#### A DREMEL MOTO-TOOL OFFERS

- √ 27,000 R. P. M. (The speed essential for good grinding and to conserve cutters)
- FULL BAKELITE SHOCK-PROOF HOUSING
- √ WRENCHLESS CHUCK
- PERFECT BALANCE



Compare, feature for feature, any of the small offhand grinders on the market, regardless of price, with a Master Model Moto-Tool. Then note that in addition to its many exclusive advantages the Moto-Tool is precision-built for precision work. Its armature is dynamically balanced to eliminate vibration. It has oil-less (oil sealed) bearings and built-in cooling fan. Air filter keeps out dirt and grinding particles. Weighs only 13 ounces. Operates on either AC or DC 110-120 volt current. Write for catalog of Dremel tools, equipment and special combination offers.

DREMEL MFG. CO..

RACINE, WIS. **DEPT. 210-K** 

## INSIST ON A DREMEL MOTO-TOOL 100 TOOLS IN ONE

perceives the figures, color blind individuals cannot distinguish the figures from the backgrounds. In mild forms of color blindness, hesitancy in naming the figures reveals the weak-

The 46 plates comprising the new American tests, provide for the detection of each type of color blindness, the particular type and degree being determined by noting the plates missed or read with hesitation.

SHICAGO, U.S. A

#### **Steelweld Tonnage Indicator**

A new tonnage indicator for bending presses has been developed by Steelweld Machinery Division of The Cleveland Crane & Engineering Co., Wickliffe, Ohio.

The indicator keeps operator and management informed of the loadings to which the press is subjected. It gives warning when dies are worn. It tells when press is being overbottomed.

SHELD ON ACCINE CO.

The indicator has two pointers:—The "Job" pointer which registers tonnage for the individual job being worked in the press; and the "Maximum Load" pointer which indicates maximum load at which the press has ever been operated.



The "Job" pointer remains at the highest tonnage reading developed by any of the operations of the job. It may be reset to zero reading at any time. Once set, the indicator requires no further adjustment.

A cover that can be locked prevents unauthorized persons from tampering with the indicator.

It is felt that this new indicator will prevent serious overloadings and consequently help add many years to the useful life of a press. Operators generally will not overload their machines intentionally, but usually are unaware of it.



MODEL 4G

#### Fires

Fire prevention Week in the U. S. A. will be observed during the week of Oct. 6-12.

Industry as a whole, has contributed more to the success of these annual observances than any other class, and it has benefitted accordingly.

Under our prese n t industrial conditions. with production on the upward curve, there is need for tightening all our defenses against fire. The fire records show that the incidence of fire increases as production rises. Our national defense requires special precautions to guard against the arsonist and the saboteur.

During the past year, it is estimated that at least 10,000 lives were lost as a direct result of fires. Most of these died in or

about their own homes when clothing became ignited from burning rubbish, open fireplaces, burning matches, cigarettes, etc. The careless use of flammable liquids, such as cleaning with gasoline and kindling fires with kerosene took heavy tools as usual.

Defective or overheated chimneys caused 54,000 fires last year. Rubbish accumulations are blamed for 19,000 fires, while 90,000 were attributed to smoking. There were 47,500 electrical fires. Torches and welding are blamed

The Nant might be for und Drills Incornection

#### Grind them on a— SELLERS DRILL GRINDER

—the way leading drill manufacturers do to produce the scientifically correct drill point. Drills ground on a Sellers last longer . . . save your machinists' time . . . help to step-up production. Your tool-room attendant can easily operate this machine. Call a Sellers representative today.

### WILLIAM SELLERS & CO., Incorporated

1616 Hamilton Street Philadelphia, Pa. SELLERS 6G



for 7,900 fires, while grease, tar, etc., are charged with 11,000 blazes. Spontaneous ignition resulted in 20,000 conflagrations and lightning caused 36,900 blazes, so it is still a factor to be considered. Sparks from machinery, friction, etc., are blamed for 3000 fires while there were 8000 suspicious, incendiary blazes. There were 26,700 fires in manufacturing plants, causing an estimated damage of \$50,630,000. The total estimated fire loss last year is placed at \$265,000,000.

## EVANS High Speed Steel REAMERS



#### LOOK AT THESE FEATURES

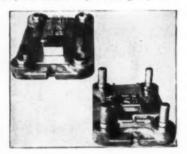
- No honing. Will not chatter.
- · Chrome-like finish.
- Perfect alignment. ull bearing surface. Left and right spirals.
- 50 to 80 thousandthe expansion. Cannot fall in slots or oil grooves.
- EVANS FLEXIBLE WILL SHIP ON 30 DAY'S TRIAL Ravenswood & Wilson Ave...

 Extension pilots for line-up work. REAMER

R CO. WRITE FOR CIRCULAR

#### Air Hardening Die Steel

An improved alloy steel, known as Windsor special air hardening die steel, has been developed by the Jessop Steel Co., 603 Green St., Washington, Pa.



It is a chromium-molybdenum-vanadium type steel, developed for use where initial cost of tool or die must be held to a minimum. It is said to be non-deforming, easily machined, extremely tough, with a wide hardening range. It may be hardened and tempered in oil or air.

non-deforming qualities are demonstrated by use in the die illustrated. This die, which has 27 holes and six large punches, is used by the Lux Clock Mfg. Co., Waterbury, Conn., to punch out clock frames-extreme accuracy being essential. It is reported that there was no measurable change in the die after heat treatment.

A new booklet describing the physical properties and giving the recom-mended heat treatment, will be sent on request.

#### Essco Steel Shop Equipment

A full line of attractive and serviceable steel shop equipment is offered by Electric Service Supplies Co., 2801 N. 17th St., Philadelphia, Pa.

The portable work and tool stand shown is typical. It is 36" wide, 24" deep and 38" high overall, including 21/2" cadmium plated swivel type castors. The drawer is 17" wide, 5" high and 16" deep, fitted with flat key lock.



Why Not Buy The Original Electric Etcher? MARK IRON AND STEEL

THE ETCHOGRAPH WAY

New ELKONITE TIP pencil. 2,000 New Baby Grand Model at a in use lower price.

WILLIAM BREWSTER & CO., INC. 42 Church St., New York, N. Y.



## PERFECT CONTROL

Torgren Regulators, like skilled jockeys, hold air power under perfect control. The diaphragm, or "lung", is made of phosphorbronze protected by a resilient member that assures quick, tireless

bounce-back-a feature found in no other regulating and reducing valve. Norgren valves last longer-cost less to operate. Available in sizes 1/8 to 1/8 for reduction of pressures as great as 400 lbs., to working pressures of 5 to 200 lbs. Suitable for air, steam, oil, water and non-corrosive gas applications.

Write for circular and prices.

### C. A. NORGREN CO., INC

214 Santa Fe Drive

Denver, Colo.

## INTERIOR STEEL SHELVING

STURDY ADJUSTABLE

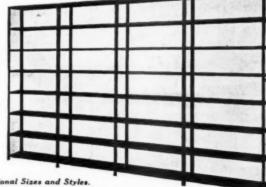
#### **EASILY ERECTED**

Style No. 15-B4

As illustrated, open type, 8 shelves in height. Rack consists of four 36s wide units. Overall 12: 0s long, 1: 0s deep, 713 high. Capacity each shelf over 400 lbs.

#### \$36.80

F. O. B. Cleveland, Ohio Shipped Knocked Down



Write for Additional Sizes and Styles.

#### EQUIPMENT

2352 East 69th STREET, CLEVELAND, OHIO

SHELVING LOCKERS CABINETS FILES DESKS







- Aluminum
- Bronze
- Stainless Steel
- **Galvanized Sheets**
- Monel
- Molybdenum
- Tantalum
- Nichrome
- Tin Plate
- Copper
- Nickel
- Silver
- Gold, etc.

There is an EISLER WELDER for every purpose.

Butt Welders to weld from .010" to ½" dia. metal. We make all kinds of Standard & Special TRANSFORMERS A. C. ARC WELDERS—100 to 400 Amps. LARGE or SMALL QUANTITY CONTRACT SPOT WELDING.

Booth D-29 National Metal Exp. FOR INFORMATION WRITE TO

CHAS. EISLER

EISLER ENGINEERING CO. 762 So. 13 St. near Avon Ave., Howark, N. J.



The two shelves are of 16-gauge steel with channel flanges.

A smaller model is 24" wide, 18" deep and 32" high overall. Drawer is 17 x 5" x 16".

Other items in the line include:drill, tool and reamer racks of various sizes; small parts racks; enclosed and skeleton storage racks; floor and wall cabinets, etc., all of which are illus-trated and described in bulletins.

#### **Duplex Die and Punch Filing** Machine

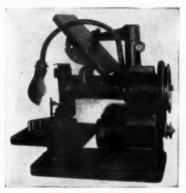
Finish filing of dies and punches is facilitated by a new dual purpose machine developed by Marburg Bros., Inc., 90 West St., New York City.

The die table tilts in all directions, (including compound angles) and the stroke is fully adjustable from 0 to 114".

As a die filer, the upper table is swiveled into working position. File holder operates from below and the file penetrates the die.

When used as a punch filer, the upper table is tilted out of the way and the lower table is then ready. punch file operates from above and depth of file movement can be controlled accurately by means of the adjustable stroke.

Both tables are accurately ground and 10" square. On either, the work is unobstructed and in full view. The crank drive can be used as a permanent drive, or it can be set as a friction drive incorporating a safety clutch, automatically reducing the stroke or eliminating it altogether should the file strike any obstruction.



Depth of stroke is 9½". Regular machine files can be used. File lengths, upper 5" or more; lower, 3" maximum. Speed— 350 and 525 strokes per minute.

#### Union Carbide and Carbon Metal Show Exhibits

A number of Units of Union Carbide and Carbon Corp., including The Linde Air Products Co., Electro Metallurgical Co., Haynes Stellite Co., and National Carbon Co., Inc., Electrode Sales Division, will be represented at the National Metal Exposition to be held in the Cleveland Public Auditorium from October 21-25.

The Linde Air Products Co., will emphasize the importance to the metals industries of such oxy-acetylene processes as welding, machine and hand-cutting, flame - hardening, wrinklebending, flame - cleaning, deseaming, descaling, and gouging. Among equipment featured will be a new cutting machine for the production cutting of rounds and squares. Also of interest will be an exhibition of equipment used in "Unionmelt" welding, the automatic



FRAY

#### Metal Duplicating without DIES



For small quantities you can shear stock sheets to size and trim metal stampings with the

Micro BENCH SHEAR Does fast work, accurate to .001 . Shearing width 61/4 . Circular free, also shows Micro Bench Bender and

O'NEIL-IRWIN MFG. CO.

Minneapolis, Minn. 314 8th Ave. So.,

Brake.

electric welding method developed by Linde.

Electro Metallurgical Co., will feature the importance of such alloying elements as chromium, manganese, vanadium, silicon, tungsten, zirconium, and columbium, in controlling the production of high-quality steels, and uniformly achieving the desired results.

Highlighting the exhibit of Haynes Stellite Co., will be a complete display of metal-cutting tools and specilaties, hard-facing rods and materials, and corrosion-resistant alloys. Actual demonstrations will show the corrosion resistance of Hastelloy high-strength alloys and the red hardness of Haynes Stellite J-Metal.

National Carbon Co., Inc., Electrode Sales Division, will show Acheson Graphite electrodes for electric furnace operation, featuring new developments in graphite electrodes and nipples for the production of high-grade alloy steels. Tapered graphite nipples, originally developed by Acheson Graphite Corp., will be featured.

#### MODEL NO. 16 "SPECIAL"

Constructed as per Specifications of U. S. Naval Aircraft Factories



Our machine carries the

BUTTERFLY FILING and SAWING MACHINE (Die Making Machine)

This is a very heavy. powerful machine and is designed for extra heavy filing and sawing, but it performs small work just as well. This type of machine is usually

Butterrly trade mark. adopted in Ammunition Plants, Airplane Factories and machine shops where heavy and precision filing and sawing is desired.

#### HARVEY MANUFACTURING CORP. 161 Grand St.,

Phone, CAnal 6-5170

## CUTS GRINDING COSTS



HEAVY DUTY

3 Phase 60 Cycle No Brushes

GASTON POWER TOOLS 2655 W. 95th St., Evergreen Pk. III.

## **Save Time and Labor on Repeat Operations**

by using Colwell Tool Post Turrets

Meet the increasing demands of industry. Available for 9\* to 20\* lathes with a new "Midget" size for smaller lathes. Also furnished for turret lathes. Provides four positions. In operation it is fast, simple, accurate and dependable.

Write TODAY for your copy of bulletin.

S. G. COLWELL, 25 Congress Ave., Providence, R. I.



#### Post-War

"An exhaust-ed Europe will be in no position to dictate the terms on which it will trade with the Western hemisphere" Eugene P. Thomas, President of the National Foreign Trade Council recently observed.

"Admittedly." Thomas Mr. "German said. economic domination in Europe after the. war might seriously jeopardize our peacetime exports to the European market itself. In fact, a total export trade of two billion dollars is our stake there.

"But whatever the outcome of this war, we shall adopt no defeatist attitude in bargaining with a postwar Europe which might unite in form-

ing an economic bloc to impose barter trading methods without adherence to a fixed gold standard upon the American republics and other non-European markets."

Mr. Thomas pointed out that the British Empire and the United States combined have over 40% of the world's total trade. The combined foreign trade of Germany, Italy and the countries now under their domination amounts to but %ths as much. Those



## **Handy for Bench Use**

- as well as for machine use.

#### BROWN & SHARPE MAGNETIC CHUCKS

PERMANENT MAGNET TYPE

offer distinct advantages for holding work at the bench for filing, scraping and many other jobs . . . especially for small, thin pieces.

No wires—No Heating—No Running Costs
—Ask for circular on both Rotary and Rectangular Models.



For sale only in the U. S. A. and its Territories

BROWN & SHARPE MFG. CO., PROVIDENCE, R. L. U. S. A.

inclined to a defeatest attitude should recall that the U. S. possesses 40% of the economic power of the entire world.

"Closer economic ties between the British and Pan American democracies, buttressed by our gold, will provide economic power and strategy capable of holding our own in any bargaining negotiations," he said.

"We should adhere to our standards of international commercial relations, upholding equality of treatment in world markets."

## ALLOY PORTABLE SHEARS



No. I cuts up to No. 11 gauge strip or sheet. No. 2 cuts up to 1/4" steel plate.

Special Blades for shearing stainless steel.

BREMIL MFG. CO. 1720 Pittsburgh Ave.,

## BURKE

#### MILLING MACHINES Make Fast Work of Small Jobs

Motor Driven

Timken roller or ball bearings to spindle

Write today for circulars.



Burke Machine Tool Co. 997 E. 16th St. Conneaut, Ohio

#### Meltomatic Paste Solder

Soldering and tinning technique is simplified and expedited by Meltomatic solder developed by Chemical Products Co., 9446 Copeland St., Detroit, Mich.

Meltomatic is described as a selfcleaning and self-fluxing paste solder. applied with a brush. It melts at a temperature slightly over 400° F., so almost any heat source will suffice. It is economical because there is no excess to melt and drop off. Brushing over the entire surface where the bond is to be made assures stronger joints than where only the edges are soldered.

The manufacturers emphasize that it permits discarding of the old melting pot, fluxes and troublesome furnaces. It facilitates soldering in cramped quarters where it is difficult to manipulate soldering irons.

In one case history, a manufacturer in tinning the ends of braided wire, now merely coats them with Meltomatic, melts in a flame and wipes. Another manufacturer uses matic to apply nameplates to motor blocks. Formerly he drilled four holes and applied plates with self tapping screws. Another manufacturer formerly consumed time cleaning acid rust spots left after soldering. Meltomatic is applied only to the areas to be soldered and does not corrode adjacent surfaces. A liberal trial offer enables you to test it in your own plant.

#### HARD USAGE Doesn't Faze The HARTFORD MILLING VISE



We also Build Machinery on a Contract Basis, Design and Develop Special Automatic Ma-chinery ... Gears and Come Cut to Order.

Because it was designed to "take it" - and it does! It will stand up, day after day, under the heaviest, toughest strain of production milling work.
Made of the best materials, with all parts interchangeable, it will outlast
four or five ordinary vises. Rapid and accurate in operation—the top
eccentric handle gives tremendous binding force, while the lower camfaced handle gives instantaneous quick-opening and return. A trial in your shop will convince you better than anything we might say.

Write for Folder and Complete Details 5

Maximum opening 3½1
Weight 40 lbs. 11/4" Jaw depth. Also made in the swivel-jaw type with hard or soft jaws, maximum opening 21/41.

HARTFORD SPECIAL MCHY. CO. 285 HOMESTEAD AVE., HARTFORD, CONN.

#### "Reciproc" Oscillating Mechanism

Drill press versatility is increased greatly by an ingenious new oscillating mechanism developed by the Specialty Machinery Co., 5606 Euclid Ave., Cleveland, Ohio.



The device fits standard commercial drill presses and comprises a gear reduction unit on a universally adjustable bracket, which in turn attached to drill press motor bracket. Gear reducer is belt driven from lower end of motor shaft. The low speed shaft of reducer carries a crank arm, to which is attached adjustable connecting rod. Other end of connecting rod attaches to rocker arm, attached to feed shaft.

With a standard 1740 r.p.m. motor, the mechanism provides the drill press spindle with 100 complete strokes (200 working strokes) per minute. Oscillating stroke is instantly adjustable to any length between 1/4" and %".

The mechanism can be left in place as it does not interfere with ordinary drill press duties. When needed, all that's necessary is to slip on drive belt and tighten rocker arm screw against feed shaft.

The utility of the device is obvious



## Does Noise Confuse Your Phone Orders?

Are telephone orders hard to hear in your shop? Does machinery noise bother you? If so, investigate the Burgess Acousti-Booth.

This amazing new phone booth shuts out factory noise, yet it has no doors. A patented sound absorbent lining blots up factory noise.

Open construction makes this booth always well ventilated and easy to clean. There are no doors, hinges, or fans to wear out.





Patented

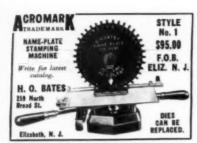
Send coupon below for full details of the Burgess Acousti-Booth.

#### Mail Coupon for Free Booklet

Burgess Battery Company, Acoustic Division Dept. HM, 500 W. Huron St., Chicago Please send Free booklet describing Burgess Doorless Acousti-Booth and how it makes telephoning easy in noisy places.

Firm Name.... Street-City .

BURGESS ACQUSTI-BOOTH 



### Work Wanted

A NATIONALLY KNOWN MANUFACTURER OF PRECISION MACHINERY HAS FACILITIES FOR TAKING ON ADDITIONAL WORK for: W. & S. Turret Lathes, Boring Mills, Lathes, Punch Presses, Screw Machines, Precision Cylindrical and Internal Grinding, also Sub or Full Assembly Work.

**BOX 142** 

c/o Hitchcock Publishing Co. 508 S. Dearborn St., Chicago, Ill.



in reciprocating a sander drum—in rotary filling or die grinding — lapping close fit holes — mixing stiff liquids with a mixing stick in the drill chuck, etc. Reciprocating motion of the sanding drum gives a superfinish that is free from the grooves and ridges obtained in ordinary single plane sanding.

## Self-Contained A-C Power Unit

A completely self-contained a-c generating unit which regulates, controls, and meters its output is announced by Westinghouse. Called the "Simpac," it combines a standard open-type a-c generator, a direct current exciter, exciter field rheostat, voltmeter, ammeter,



#### Moving? Then-MOTORIZE!

It's cheaper to motorize your present machine tools, than to install and maintain overhead line shafting. That's what concerns using Remco Drives, tell us. Profit by their experience—find out how quickly Remco Drives are installed. How the saving on belting alone frequently pays for a complete Remco installation. Write—Remco Products Corp., State St. at R. R., York, Pa.

#### **REMCO MOTOR DRIVES**

for LATHES, SHAPERS, DRILLS, MILLING MACHINES, etc.

and optional voltage regulator in one integral unit. It was designed especially to fill the need for a completely selfcontained generating unit for use in out

of the way localities, or for special requirements in industrial plants. It may be either engine or electric motor driven, direct or belt connected.

Ratings from 3.75 to 187 kva., are available with voltages of 120/208, 240

or 480, with operating speeds from 600 to 1800 r.p.m. Units above 187 and up to 312 kva., may be obtained with separately mounted controls. All come wired and assembled.

For additional information write Dept. 7-N-20, Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

#### "Truform" Tool and Die Steel

A new six page folder describing "Truform", a non-shrinkable, oil hardening alloy steel for use in tools and dies where extreme accuracy is required, has just been issued by the Jessop Steel Co., 603 Green St., Washington, Pa.

It describes the physical properties of Truform, which include a low coefficient of expansion, greater hardness, exceptional toughness and good machinability. Also described are the recommended heat treatment and typical applications. A chart illustrates the tempering range for Truform.



## MASTER MECHANICS say NONSLIP Pulley Covering Is The Best Thing They've Ever Used

Here's why-

"Getting 10% to 15% more production."

"Nonslip increased pull on our drill press over 100%."

"Results were amazing."

Nonslip Pulley Covering is easy to try, easy to apply, (see illustrations at left) and economical to buy. Pays its cost many times over in a short time with increased production from your present equipment.

Wherever belts and pulleys are used, Nonslip is needed. Write today for literature, prices, and our *Unconditional Guarantee*.

4 Apply Tightly and Allow to Dry

Some territories still open for qualified representatives. Write for details.

#### NONSLIP PULLEY COVERING CO.

781 HERTEL AVE. BUFFALO, N. Y.

#### Kennametal Horsepower Chart

McKenna Metals Co., 135 Lloyd Ave., Latrobe. Pa., offer a new chart (No. 5) listing the horsepower requirements for cutting steel with Kennametal-tipped tools.

The purpose of the new chart is to enable the Tool Supervisor to advise the machine operator what depth and feed the machine will pull in cutting steel with Kennametal tools. Timestudy men will find it useful in recommending the best feeds and speeds for the equipment available; or for recommendations on the size of motors required on lathes and boring mills for which certain combinations of speeds and feeds will be demanded.

A formula on the chart enables anyone to calculate the Horse Power required for any steel of which the tensile strength is known and on which a known feed and speed of cut is to be

used.



Two bright new bulletins describe the new precision jobbing work service offered by Acme Industrial Co., 210 N. Laflin St., Chicago, Ill. Acme has precision modern equipment for producing a wide range of hardened and ground parts of all types and all size—facilities for handling orders for one piece or many thousands—with accuracies within .001", .0001" or .00001" as necessary. Their engineering service will cooperate in designing parts for most efficient production. Addition of a new thread grinder enables them to handle work of that class.

#### Fray All-Angle Milling Machines

A handsome new 8-page catalog introduces the line of "All Angle" milling machines made by Fray Machine Tool Co., Glendale, Cal. Large illustrations show the detail features, which are clearly described in the text. Fray milling attachments are also included, along with the back gear unit, offset boring tools and end mills.



#### AN INEXPENSIVE ABRASIVE BAND GRINDER



#### "Built Like A Machine Tool"

The Hormel-M Grinder is sturdily built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on belt. Ball bearing throughout, equipped with Alemite lubrication, complete with grease gan.

Write for illustrated folder on this and other styles and sizes.

WALLS SALES CORP.
96 Warren St., New York, N. Y.

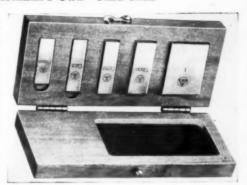
#### "Mechanic's Own" Ultra-Chex

The George Scherr Co., Inc., 122 Lafayette St., New York announces addition of the "Mechanic's Own" set to its line of Ultra-Chex precision length standards.

Designed as a unit, this small five-block set will enable the individual mechanic to produce a given tool, fixture, jig, gauge or work piece with the assurance that the result will be correct to specified accuracy limits.

The five gauge blocks, accurate to 8 millionths of an inch, are provided in the following dimensions:—
1" — .500" — .250" — .125"

- .0625"



In principle, the process harks back to-and derives its name from-one of the earliest forms of welding: heating, forging, re-heating, re-heating, re-forg-

#### Resistance "Forge-Welding"

"Forge-Welding" is a new process of heavy duty electric resistance welding for spot welding heavy steel and iron sections heretofore considered impossible to weld with conventional equip-With it, such work can be handled almost as easily and rapidly as spot welding sheet metal.

The process as announced by Progressive Welder Co., 3019 East Outer Drive, Detroit, Mich., has the promise of opening new fields for resistance welding in the fabrication of structural steel assembly. Even the fabrication of heavy sections for defense equipment are expected to come within its capacities.



precision or production grinding

Use wheels on either end of the spindle

Sizes up to 2 H. P.

THE SAROSTON CO.

251 Park St., Upper Montclair, N. J.



## Janette Speed Reducers

FOR SLOW SPEED DRIVES 43 Sizes-1/50 to 10 H. P. -. 08 to 1140 r.p.m.

Motorized and motorless reducers with foot or flange bases - Standard or special motors are available—Easy to install and maintain—can be mounted in 12 posi-tions—adaptors are seldom needed—ball bearings have individual grease cups to insure clean grease-all machines built complete and guaranteed by ONE organization,

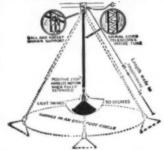
Ask For Your Copy of Our 100-Page Bulletin

Janette Manufacturing Company 556-558 West Monege Street Chicago, III U.S.7. ing, etc. In comparison, however, the new process is extremely rapid.

Although developed over a year ago, announcement had been withheld pending completion of field tests on various types and thickness of metals under actual service conditions.

Typical of work now being handled is:-welding of two pieces of 36" stock to a 1" section; welding together two 1' section: welding together two 1" sections, etc.

Light-Universal Movable Stays Put best for machine shop and drafting room and avoid glare or head strain. (Fastened above your work).



Push it up, pull it down, swing it out, swing it around, it stays put.

Write for Literature.

J. Zabora Machine & Gear Co. 1321 S. Mint Street, Charlotte, N. C.



Surprisingly, resistance Forge-Welding requires no highly specialized or expensive equipment. In effect the welding is done on a variation of standard equipment.

The process consists of first applying pressure to the work, then inter-rupted current, and finally super-imposing a hammering action on the electrode. Under high pressure and with sufficient heat, the surfaces of work are brought into such intimate contact that when additional "impact-pressure" and intermittent heat are applied a forged weld of superior quality is obtained



#### GOOD NEWS for DIE MAKERS

Transfer Points Eliminate Guesswork in Die Making

There's no chance for error when you use transfer screws as markers in setting dies. Points are of uniform height above hex base. Six accurately made and hardened screws nest in a special holder with hex wrench tip. Made in ¼° to 1° diameters. 5/16\* \$1.25 per set 3/8\* 1.35 \* \* 81.40 per set 3/16 81.50 per set 7/16\* 1/48

HEIMANN MFG. CO.,

URBANA, OHIO

To secure the forging effect while yet holding the work under pressure, a compound action "Hydro - Booster"—another recent development of Progresive—is used. With it, a rapid succession of blows can be super-imposed upon the initial constant pressure under which the work is being held.

The equipment recommended consists of a standard pedestal-type holder having the compound "Hydro-Booster" mounted on the upper arm immediately above the welding electrodes. booster consists essentially chambers, one above the other, each capable of receiving air under the usual 90 lbs., factory line pressure individually or separately. The piston of the upper chamber can act on the top of the lower piston to increase the resultant welding pressure. In this manner, the lower piston supplies the necessary initial pressure, while the up-per piston, acting independently, can super-impose the hammer-blows required for the operation. Thus, the initial pressure of 2,000 lbs., together with sufficient heat, brings the surfaces of the work into intimate contact, and the combination of interrupted heat and intermittent hammering (approximately 1,000 lbs. per blow) combine to complete the weld.

Special equipment required is of the "accessory" type. A special timer which can control the sequences of operation for any condition yet encountered, is used. A special alloy type of electrode has been developed to withstand the high pressures and heat.

Size of spots vary according to metal, etc., but generally on work totalling 1½" thickness, the spot will be approximately 1" in diameter near the surfaces with the diameter about 50% larger as it approaches the mid-section—typical of forging action.

To suit varying metal thicknesses, types of alloys, etc., the number of heat interruptions and "forging" blows can be varied. On certain types of work, interruptions of heat and application

# Pefense



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## Chrome Plated GAGE BLOCKS

answer your problem in the factory, and in the laboratory.

Don't let production worries or problems stop you. Dearborn Gage Company's Chrome Plated Gages are: accurate, longer wearing and offer the greatest economy.



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Simply insert in holes, invert, strike sharply and you have ceaters and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S.—Inexpensive—last for years.

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1859 Gardner Ave.
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of "forging" pressure will be synchronous, while on other types of work heat and pressure is applied alternately.

Portable spot welding guns can be used for Resistance "Forge- Welding" —primarily on work up to about ½ ½ ½ ½. With such equipment the process differs in that pressure is supplied in two stages: first, a welding or contact pressure, then a heavy "squeeze" or forging pressure. Otherwise the operation is essentially the same. The reason is, of course, that with the portable gun, the "Forge - Welding" head would be cumbersome.

#### National Safety Congress and Exposition

The worthy cause of safety in industry will get the spotlight at the 29th National Safety Congress and Exposition, to be held at the Stevens Hotel, Chicago, October 7-11.

Practically every branch of industry will be covered in the sessions of the various groups. There will be a great number of outstanding speakers and interesting discussions, covering almost every phase of manufacturing and production activity.

The industrial and public safety exhibits will include all manner of safety devices and equipment.

With the general speeding up of industry, safety measures, practices and precautions have become increasingly important. Any time devoted to attendance at the sessions and study of the exhibits will pay dividends in safeguarding busy workers.



Globe

Machine Shown

Automatic Dial Type with hopper feed. Facing and tapping operation combined.

## Do You Have Drilling & Tapping Problems?

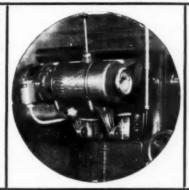
Let us prepare a quotation for you without obligation for handling your work at high production on a Globe Automatic. Drilling, tapping, facing, countersinking, etc., handled either singly or combined. Send us either sample parts, blue prints or sketch.

Globe Tapping Machine Co. Bridgeport, Conn.

## 4 SPEEDS AT YOUR COMMAND SCHULTES FOUR SPEED DRIVE

Shaper operation is made more flexible—more efficient with a SCHULTES Four Speed Drive—with just the right speed for the job—at Your Finger-Tip.

The modern drives are equally valuable for lathes, milling machines, drills or punch presses. They're low in first cost and easily at-



tached. Soon repay their cost through savings which they make possible.

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## BEATTY'S No. 100 EXTRUDING PRESS Featuring Seven Points of Superiority

1—Greater Production. 2—Rigid One-Piece Frame, Eliminating The Rods. 3—Free Open Space for Loading Material Chamber. 4—Quick Opening Die Head for Cleaning. 5—Plexible Coupling Type Packing Head on Plunger. 6—Rapid Return Speed. 7—A Self-Contained Unit.



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For DRILL PRESS. Often Used on MILLER, SHAPER or PLANER



Fig. 1 With Jig Attachments

The Attachments mean much duplicate drilling without expensive jig making. A simple single-purpose jig will cost more than the Vise, which will do many jobs. Remove attachments — Good Plain Vise.

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Deliver a Known
Quantity—and Quality
—of Service

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TOOL COMPANY

DETROIT

#### "Cub" Paasche Airbrush

A new Paasche "Cub" Airbrush not only looks new and different, but is new and different in many ways. The new easy-grip, black tenite handle the new larger, easy-pull trigger—the new knurled tenite fluid lock control are readily apparent.

Other features include a new calibrated control of spray; larger, more easily removed and easy to clean aircap, claimed to do away with defective spray patterns, orange peel, streaks, runs and sags, air and fluid leaks, excessive mist. The shorter fluid passage is said to increase coating speed and prevent clogging.



The new "Cub" is light in weight, and easy to handle. The shorter, stronger needle with efficient cone shaped point prevents clogging. There are only two parts to keep tight. All finished materials are said to be atomized at high speed under complete control, providing a wider, wetter spray. It



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for stamping in Metal, Fibre, Plastics, etc. Do faster and better work than Single Steel Stamps. For Marking Metal Parts, Name Plates, Metal Checks, etc.

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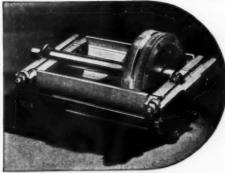


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CUSHIONED AIR CYLINDER

The action of the cushioned part of an air cylinder stroke depends on variables that are, at best, difficult to determine. This condition can be offset in part by having this cushion action adjustable. Cushion adjusting screws operate to "slow" or increase the speed of the cushion action.

Furnished as standard equipment on T-J Cushioned Air Cylinders, these screws may be readily adjusted and locked in position on the job. Write for catalog 36-A to the Tomkins-Johnson Co., 605 N. Mechanic St., Jackson, Michigan.

this is a TOMKINS-JOHNSON product

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No guesswork—bearing failures waste — idle machine time — oilsoaked motor windings.—fire and accident hazards, when you use TRICO OILERS. There's a type for every application.

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TRICO FUSE MFG. CO. Milwaukee Wisconsin



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Eliminate heavy lifting. Cut handling costs. Table

swivels and locks in any position. Can be varied 151/2 by slight foot pressure, leaving operator's hands free. Engineered and built by tool engineers, experienced in production of special machines, dies, jigs and fixtures for exacting requirements.

Send TODAY for illustrated catalog No. 2.

MIDWEST TOOL & ENG. CO. 112 Webster St., Dayton, Ohio may be used with pressure tank or overhead bucket, gravity or syphon cup. It is adjustable for any air pressure or any air consumption.

Full information will be supplied without obligation by the Paasche Airbrush Co., 1909 Diversey Parkway, Chicago, Ill.

#### Controlled Centrifugal Force Feed Lubrication

A new bulletin describes the force feed oiling system recently developed by Onsrud Machine Works, Inc., 3906 Palmer St., Chicago, III.

Particularly applicable to ball bearing spindles, the controlling factor is a small control plug of especially prepared porous material, pressed through the side wall of the spindle. This plug connects the internal oil reservoir with the edge of the bearing retainer.

The size and substance of the plug are carefully processed to permit passage of oil feed into the bearing by centrifugal force of the revolving spindle. Porosity is determined by the operating speed of spindle and the size of the bearing.

Where multiple speed spindles are used, the rate of oil feed is averaged so that the bearings will receive a sufficient quantity in accordance with each speed requirement. Rate of feed will not be excessive at high speed, or insufficient at low speed. Oil reservoir capacity is sufficient to prevent interruptions in production for lubrication.

## DON'T CUSS when your taps break off ...

THE "WALTON" TAP EXTRACTOR will remove them easily and quickly



No longer necessary to anneal the broken tap. The steel fingers of the Extractor, inserted in the flutes of the broken tap, remove the broken piece intact. Made in all standard sizes from No. 4 to 1½°. 2, 3, and 4 flute styles.

Will you give it a 30 days free trial?

Ask for Folder 131.

THE WALTON CO., 95 Allyn St., Hartford, Conn.

#### Beryllium Alloys for Defense

Promise of revolutionary changes in the bombing power, speed and construction of planes for the American defense program is offered by development of new metal alloys based on the remarkable properties of a substance called beryllium.

Already War department ordnance officials are reported to have tested beryllium successfully for use in mass production of parts for the new Garand rifle. Pleased by the results, these experts revealed they are working toward using beryllium alloys to break at least partially, the defense "bottle-necks."

The Garand rifle tests were made in cooperation with the Beryllium Corp., Reading, Pa. There are great potential uses for beryllium in aviation, because of the metal's resistance to fatigue and corrosion, its extraordinary light weight and electrical conductivity.

Beryllium is an element just like hydrogen, copper, or iron. One of the



## Write for Catalog **WF**

The most complete catalog of its kind. Lists 5000 different shapes, sizes and cuts of GROBET Precision Swiss files.

Learn more about these chrome Steel Files that have won a reputation for utmost precision and durability.

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STOP spoilage. Get exact
tem per ature
of work in
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#### RECLINABLE POWER PRESSES



We manufacture a complete line of mechanical power presses, with sizes and types for every need in your shop.

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ZEH & HAHNEMANN CO. Newark, New Jersey metal's greatest advantages is its lightness. It is not much heavier than water and 2/3 lighter than aluminum.

Because of this weight factor and other properties equally spectacular, metallurgically speaking, the National Defense Commission has recommended a series of "educational orders" on the theory that the more beryllium used in a plane, the lighter the ship and the higher the pay load of commerce, bombs or parachute troops.

Just a pinch of beryllium (2 percent) is said to transform copper into something comparable with steel and with even more resistance to fatigue than steel. A beryllium-copper file will cut through steel without a shower of sparks—which is a good reason why tools made of the alloy are being used more and more by men who work round oil and gasoline.

#### Sterling Changes Name and Address

The Sterling Products Co., of Detroit and Los Angeles is now the Sterling Tool Products Co., of 363 East Ohio St., Chicago, as of September 1st, 1940.

In announcing the removal and name change, C. B. Johnson, formerly Sales Manager of Sterling Products, who becomes Vice-President and General Manager of the new Corporation, says:—

"Heretofore our factory and administrative office have been located at Los Angeles, and our general sales and service office at Detroit. The new arrangement will bring both units together and will facilitate our service

SOOO SIZES Files SHAPES AND SWISS FILES

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#### MAKE YOUR DRILLING JOBS EASIER

Increase Profits . . . Speed-up Production End Worker Fatigue . . . Increase Efficiency

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#### DRILLMASTER RADIAL DRILL

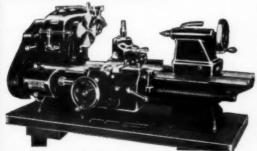
Economical in operating and first cost, this floor type, heavy duty, precicion-made, well-balanced Radial offers many features that merit your careful consideration. Drilling to the center of a 36° circle, No. 2 Morse Taper and heavy duty ½ HP ball bearing motor. The full floating, ball bearing spindle assures free and sensitive operation at all speeds.

Send TODAY for bulletin giving full details.

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Make your initial investment do more and last longer. Use Clausing Lathes for production, maintenance, in your tool room, for every light turning requirement. Equipped with Precision TiMkEN Bearings, their long precision life and low first cost make them pay good dividends wherever installed. If you are interested in a lather, write for our new catalog today?



Four different models, each in three bed lengths. Standard and quick change types, \$150. to \$266.

See partial dealer list at right. Write for name of dealer nearer you.

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All Die Makers' Supplies Precision Dowel Pins Commercial Sets Special Sets Die Sets

and production operations. There have been no material changes in our field sales organization, but the greatly expanded manufacturing facilities and closer coordination of sales and administration will bring us into wider and better contact with our customers' needs."

The new organization will continue manufacturing and selling the popular Sterling Speed-Bloc pneumatic sander and the Sterling Gyro electric sander.

#### Chicago Pneumatic Reversible Wrenches

Three new sizes of reversible pneumatic wrenches are announced by Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y. Bolt capacities are %", 5%" and 34" respectively.

Simple and positive in operation, these wrenches are especially useful where quantities of nuts are to be applied or removed. No gears are used and the driving unit is springless. The short overall length is a decided advantage in restricted quarters.



#### DIAMOND DRESSER

- **ECONOMICAL**—All Diamond Stones used completely up without loss or
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The slow speed power vane motor is simple in design and economical in maintenance.

Overall length of the %" unit is 6½"; spindle offset is 1-%" and the net weight is 4¼ lbs. The %" wrench weighs 9½ lbs., and the ¾", 13 lbs.



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Tast Sale Occurate Outomatic
Keep up with production schedules, yet keep costs down by
installing Wittek Automatic Roll Feeds—the feeds that have made

automatic punch press operation practical on even comparatively short runs.

They can be installed on any make or size punch press without alterations . . . will handle any coiled stock and feed from right to left, left to right, back to front or front to back in any length from 0° to 24° per press stroke at catalog speed or faster.

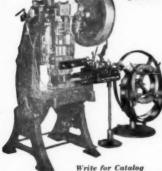
#### **Improved Operating Principle**

Improved, simplified method of operation insures rapid smooth, accurate feeding. Made in 3 types, Wittek feeds save dies, reduce scrap and cut maintenance costs to a minimum.

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6 types—a type for every job, Will handle any stock (metal, foil, paper, etc.) Wittek No. 3 (illustrated) has automatically expanding coil holders that center the coil and assure maximum production by eliminating looping, tangling and backlash of stock.





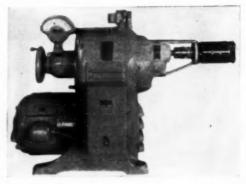
WITTEK MFG. COMPANY
4305 W. 24th Pl. Chicago, U. S.A

#### Aero Test Stand

A new Aero Test Stand has been developed by U. S. Electrical Motors, Inc., 80— 34th St., Brooklyn, N. Y. and 200 E. Slauson Ave., Los Angeles, Cal., for testing aircraft generators, vacuum pumps, hydraulic pumps, alternators. etc.

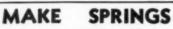
It was developed to determine whether generators carry rated loads through normal operating speeds and also to determine whether the clutches remain engaged throughout the normal engine operating speeds and disengage at a predetermined speed.

The generators are also tested at speeds in excess of maximum operating speeds to make sure (1) that the bearings will not overheat or seize (2) that the commutator bars will not raise or warp at high speed (3) that the commutator leads will not throw their sol-



der or leave the slots (4) that the windings will not raise under the centrifugal force (5) that the armature banding will not break under such conditions.

The accessory to be tested is rigidly aligned by locking it in place on the



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Blaner Universal Hand SPRING

Here's a profitable tool room unit. Quickly makes hundreds of sizes of springs. Sturdy, dependable... a real time and money-eaver.

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Manufacturers of Resistance Welders—Foot, Motor, Air and Hydraulic operated.

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Don't compare the price of the 1 H.P. MARSCHKE BENCH or PEDESTAL TYPE TOOL GRINDER with machines of similar capacity unless you compare details of design accounting for convenience and safety of operation. Compare, also, the material specifications and standards of workmanship. The Marschke is a quality product and quality is important because the best is always the cheapest in the end.

Let us send you the details of this small machine, together with a catalog showing 70 different Grinder and Buffer specifications of MARSCHKE GRINDERS and BUFFERS.

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1805 Madison Avenue,

Indianapolis, Indiana

mounting bracket.

The stand provides positive speed changing means capable of covering the full range of testing speeds.

The speed changes are accomplished by varying the effective driving di-ameter of the varidiscs or sheaves. The varidiscs reciprocally expand and contract for higher or lower speeds, transmitting power through the belt to the take off shaft. Speed of the motor is constant while the speed of the take off shaft is adjustable to any r.p.m. desired, by handwheel control,

A positively driven magneto generator and calibrated speed indicator accurately show the output r.p.m.

#### Tap and Reamer Aligner

This new tool, designed and made by Forest City Bit & Tool Co., Rockford, Ill., is simple in operation but effective and accurate where any vol-ume of hand tapping is necessary.





Tap holder is of high grade tool steel, the sleeve hardened and ground, and jaws are of tool steel, specially processesd.

The aligner or holder is of close grain cast iron and the hole and face are machined accurately, for correct tap alignment.

Operation is the same as with any tapping tool but no time is lost in setting square for alignment, and tap breakage is greatly reduced.

Capacity-No. 1-1 to 5/32" square; No. 2-5/32" to 1/4" square: No. 3-3/16" to 5/16" square.



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WIREGRIP Belt Hooks \_6 sizes of tough hooks conveniently carded. No waste. Makes smooth humpless flexible joint on all flat belts.

STEELGRIP Locing \_ 8 sizes, applied with a ham-mer. For all flat belts on tough drives. Prevents end fraying.

Here at one source are all belt lacing needs, dependable satisfactory products of guaranteed material and workmanship. Write for Catalog.

Newest Member of the

Type 2% Worm Reduction Unit The advantages of

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DIMENSIONS - 71/2" x 5" x 7" WEIGHT-22 lbs.

money because of long life, dependable construction, This new unit and many others are shown in the Abart catalog. Make sure you'll get the right reducer for your job. Write for the Abart catalog and check H. P. ratings and other technical data against your requirements. Write. GEARS. Abart ent gears are accurate and made only to your B, P or specifications, Send sample or specifications for estimate. Prompt service,

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# I use a STERLING SPEED-BLOC SANDER

It saves time—and me too. I like it because I can do so much better work—in one-third the time—and the boss likes it because it pays for itself in just a short time—often in a few weeks. It cuts down on labor and material costs as much as 75%.

Take it from me-every workman should use a Sterling-it's so easy to operate-you just guide it over the work.

Ask for a Free demonstration.



#### STERLING TOOL PRODUCTS CO.

(Formerly Sterling Products Co., Detroit)
357 E. Ohio St., Chicago



BALDOR ELECTRIC COMPANY 4368 Duncan Ave., St. Louis Mo.

STURDY BUILT

for Long, Hard Service

A complete line—6\* to 12\*; Bench and Pedestal types; heavy duty; ball-bearing; Price range \$19.50 (at left) to \$186.60 (at right)
LYR. GUARANTER

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#### any type spindle, Male or Female. ERICKSON STEEL CO. East 80th & Bessemer,

Chuck Shank can be made to fit

Ohio Cleveland,

Radiac Abrasive Cut-off Machine

A new type "M" unit is offered by A. P. DeSanno & Son. Phoenixville, Pa., for dry cutting only. Of heavy duty bench type, it is designed to meet the



demand for a medium priced machine which will cut heavier stock than lighter machines.

It uses a 12" diameter disc by 1/16". 3/32" or 1/3" in thickness; a 5 h.p. motor with a 5 V belt drive. Machine is provided with two sets of interchangeable

**Plain Type** 



MARK

Offset Type

CONTINUOUS HIN

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

THREE-FOURTHS OFFSET.

AUTO MOULDING & MFG. CO.

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SPECIFICATIONS: Open Width 1/4" to 6"
Gage Material .040 to .125
Pin Diameter .101 to 1/4
Lengths to 120"

### CUT COSTS-INCREASE PRODUCTION

with

### DETROIT POWER SCREWDRIVERS

These MAGAZINE FEED POWER SCREWDRIVERS DRIVE SCREWS FASTER THAN EVER BEFORE.

Machine screws, wood screws, brass screws, aluminum screws, self-tapping screws, drive screws, cap screws, special screws, washer assembled screws.

Standard heads, special heads, Phillips heads, slotless heads.



which provides handling a wide range of screw sizes. From a No. 2-56 screw to a 5/8° cap screw.

### UNIFORM TENSION-NO MARRING OF HEADS

No stripping of threads.

DRIVING TIME: 1 to 2 seconds per screw.

SEND SAMPLES FOR PRODUCTION ESTIMATES

DETROIT POWER SCREWDRIVER CO. 5363 ROHNS AVENUE :-: DETROIT, MICH.



Model B

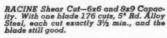
The RACINE Shear Cut—
Fastest Cutting Production Saw

This metal cutting saw, built on the exclusive positive, progressive screw feed principle, feeds the blade uniformly and progressively throughout the cutting stroke, allowing each tooth

and cuts faster.

This Shear Cut Model is one of a very complete line, including RACINE Heavy Duty Hydraulic Machines, RACINE Medium Duty Hydraulics and RACINE Utility Saws-6\*x6\*-to 14x20\* Capacities.

to take a long curling chip. This smooth shearing action saves blades



### RACINE TOOL & MACHINE CO.

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Racine, Wis.

# Champion Expanding Mandrels

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½" to 6½" Efficient—

Dependable-

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THE WESTERN TOOL & MFG. CO.
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wheel flanges; has a special angular depth adjustment with locking device which is quick acting; a special quick acting work clamp for holding stock within the capacity. Vise opens from O to 2-1/2".

Work is clamped in the vise by spring tensioned jaws. A hand lever is provided for quick release. The machine and clamping device are mounted on a steel base. Also is available without base so a customer can mount it on his own bench.



PRESSING trigger creates strong vacuum in cup for holding flat-surface materials for feeding to press. Releasing trigger releases piece held. Keeps hands out of danger zone. Single and double-cup types.

ASK FOR BULLETIN 9-C.

### F.J. LITTELL MACHINE CO.



#### Model No. A

# PETERS VERTICAL OSCILLATORY GRINDER



The speedy modern way of grinding and stoning tools and dies. The short oscillatory movement eliminates lines in ground parts—straight, smooth, square surfaces and adjustable to any required angle. Will show savings up to 80% on tool and die cost, with increased accuracy and versatility.

Write for bulletins giving full details.

PETERS TOOL COMPANY, INC. 114 E. Scott St. Milwaukee, Wis.



Model No. 101

All Roads Lead To

# COMFORT DETROIT

500 ROOMS All With Tub & Shower \$1.50

FRANK WALKER

HOTEL VOLVERINE

# SPECIAL TOOLS AND GAGES DESIGNED and BUILT



# DIES—JIGS AND FIXTURES LARGE OR SMALL

#### COMMERCIAL JIG BORING

We can handle your jig boring work at reasonable prices on our 18°236° Pratt & Whitney jig borer. Prompt service,

#### COMPLETE HEAT TREATING EQUIPMENT

Have been delivering satisfaction since 1929. Let us help you on your tooling problems.

### QUALITY TOOL & DIE CO.

RAY W. RICE, Manager

401 N. Noble St., Indianapolis, Ind.

Protect Your Workmen

Keep workrooms and factories free from dust and fumes. The Berg Fume and Dust Collecting Unit is extremely flexible, and is quickly and easily moved to cover every spot within a circular space of 12 feet in diameter. The Berg Unit is constructed entirely of metal. Low in first cost and up-keep, and easily installed. Approved by State Department of Labor and Industries. Write for further details.

We install all kinds of dust collecting systems, and carry in stock new and rebuilt blowers and dust collectors.

Write for quotations TODAY

C. F. BERG & CO. 72-74 Dedham St., Boston, Mass.



### Novel Hook-Up Facilitates Die Work

Unusual simplicity of operation possible when a universal duplicating control is used combination with a standard boring mill. enables a boring mill operator, hitherto unskilled in die duplicating. t o turn out dies to required accuracies. The duplicator, made by Detroit Univers a l Duplicator Co., 229 St. Aubin St., Detroit, is shown.

The combina-

tion, in use at the Superior Tool & Die Co., Detroit, is said to permit the company to meet delivery dates on this season's unusually large number of diesotherwise an impossibility even with the ordinarily adequate number of conventional duplicators in its shop. Rapidity with which the control can be connected with any machine tool, such as a boring mill, permitted the company to order the duplicating control after the work was already in the shop. However, the company expects to meet delivery date by a comfortable margin.

While this combination of boring mill and control unit represents the least costly of any single piece of duplicating equipment in the shop, its speed of operation and accuracy is said to meet all requirements.

The control unit, connected with the longitudinal feed of the mill, automatically controls that feed to regulate the depth of the cut. Vertical feed is governed by the mill itself, leaving to the operator only the shifting of the table longitudinally for each new cut.

Pattern (plaster of Paris) and work (tool steel for inner door piercing die) are mounted in the usual manner.



Tracer head is mounted on the boring mill and tracer finger is lined up with the cutting tool vertically in two planes



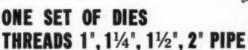
### AUTOMATICALLY SHARPENS METAL SAWS IN GANGS

Up to 51/4" diameter and up to 13/4" thickness. 100 SAWS of 26 GAUGE CAN BE SHARP-ENED AT ONE TIME.

The saws are automatically indexed and sharpened within a variation of plus or minus .001 of exact diameter of entire lot.

WRITE FOR CIRCULAR

The WARDWELL MFG. CO.





- with a "TOLEDO" SIMPACT Ratchet Threader.

Dies are high speed steel and may be resharpened many times. Sizes are changed quickly with the finger tips. Automatic drip oiling. 24\* tubular handle. Easier operating than other self-contained stocks. Adjustable rear guide is easy and quick to center. Minimum number of parts assuring long life. Easy to clean, assemble or disassemble. You will like this new 'TOLEDO'' threader. Order from your dealer today.

THE TOLEDO PIPE THREADING MACHINE CO. TOLEDO, OHIO NEW YORK OFFICE, 502-No. 2 RECTOR STREET BLDG

BUY FROM YOUR

TOLEDO"

LOCAL DISTRIBUTOR

A STORAGE UNIT THAT

# REDUCES HANDLING

OF PARTS AND MATERIALS



Because Stackbins are portable containers—not fixtures, parts and materials can be carried to departments, from machine to machine, or held in stockrooms without being transferred from one container to another. Stored in Stackracks, any Stackbin is instantly accessible when its contents are needed—without disturbing any other bin.



STACKBINS are individual hopper-fronted stacking bins, designed for storage, transportation and assembly.



STACKRACKS are individual units which lock together to form storage racks of any size, shape or capacity, into which Stackbins slide like drawers.

Stackbins in Stackracks offer a storage system that reduces handling, saves valuable space, and speeds work. Write us for complete details and low prices.

STACKBIN CORPORATION
55 Troy Street Providence, R. L.
"Stacked And Still Accessible"



with both the finger and the cutting tool touching identical points of pattern and work respectively.

When vertical feed is started, the tracer, following the pattern, relays an interrupted series of electrical impulses to a solenoid controlled plunger-type valve which permits oil under pressure from a hydraulic pump to actuate a hydraulic motor for control of the longitudinal feed. In this manner the unit limits the depth of the cut being made in close accordance with the contour of the pattern.

Simplicity of operation and elimination of necessity for especially trained operators to handle such equipment will enable the set-up to be placed on a 24 hour basis if needed. Based on the time required to train the single operator now using the set-up, the company anticipates no difficulty in putting two additional operators on the machine to round out the three shift operation.

### Chicago Shop Spot-Lights

A new bulletin presents the line of All-Ratchet shop spot-lights offered by Chicago Die Casting Mfg. Co., 2513 W. Monroe St., Chicago, Ill. Ratchet flanges are used in the joints, replacing the friction washers formerly used. These permit free and easy operation in every direction. Reflectors are provided which may be tilted to any angle. A wide assortment of sizes and types is offered, for easy attachment to machines, benches, desks, etc.





Write TODAY - and let us tell you more about them.

MODERN MACHINE CORP. 323 Berry St., Brooklyn, N. Y.

### **Defense Stimulates Welding Interest**

No-it's not a group of Men from Mars-or a Secret Society meeting. It's a typical group of students in a welding school receiving preliminary instructions on a specific welding application before dispersing to their individual booths to practice this operation. Welding schools all o v e r the country report record attendance these days as men sense the demand for skilled arc welding

operators that has been stimulated by the National Defense Program. Are welding is already playing an important part in the Program, not only in actual government activities, but in various industries producing Defense materials. (Photo—Courlesy, Hobart Bros., Co., Troy, O.)



Each metal-turning story is an analysis summary of the machining of a part and is written in a manner that makes the data valuable to new operators as well as skilled machinists, foremen, engineers, superintendents, and executives. Operation sequence, feeds, cutting speeds, tolerances and machining

### Metal-Turning-Balancing Case Studies

Featuring jobs which find their counterparts in a large number of machine shops, the current release of Gisholt Performance Data Sheets supplements the previous releases which have been widely used for instructing machine operators. These studies include metal-turning operations on turret and automatic lathes, and static-dynamic balancing on a Dynetric balancing machine.

### BURR KEYSEATERS



Mill keyways in the run or on the ends of shafting already erected — save money on alteration, erection, and repair work.

Made in 4 sizes, for hand or motor operation.

Write for Bulletins and prices.

JOHN T. BURR & SON 429 Kent Ave., Brooklyn, N. Y.

## LOWEST-PRICED

HIGH-GRADE COMBINATION KNIFE GRINDER
AND SAW SHARPENER

Rogers Type E comes with belt drive or built-in ball-bearing motor; with or without saw-gumming attachment for circular saws up to 22° dia. Three sizes: 20°, 32° and 38°.

Write for details.

SAMUEL C. ROGERS & COMPANY
203 DUTTON AVE.
BUFFALO, N. Y.





- 1-Size and shape of bearing block
- 2-Overhang or distance from shank to boring bars
- 3-Simple or complicated design
- 4-Accuracy or readability of dial screw
- 5-Range of boring jobs
- 6-Are boring bars, wrenches, etc., included?
- 7-Is the price reasonable?



### CRALEY OFF-SET BORING HEADS

meet all your requirements. Made in 7 sizes for everything from the smallest holes up to 20\* diameter.

Write for full information.

C. C. CRALEY MFG. CO. SHILLINGTON, PENNA

times are supplemented by tooling photographs and diagrams. The subjects of these stories are manufacturers of automobiles, oil well equipment and industrial machinery.

The balancing data covers the procedure followed by a manufacturer of ventilating equipment in locating, measuring and correcting unbalance in sirocco type fans. The methods employed for each step are described in detail.

This information is contained in Performance Data Sheets Nos. 58 to 61, copies of which are available from Gisholt Machine Co., 1185 East Washington Ave., Madison, Wis.

### Jackson Vertical Drilling and Boring Machine

A new precision high speed ball bearing vertical drilling and boring machine has been developed by Jackson Machine & Tool Co., Jackson, Mich.



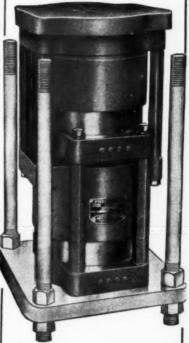
It is especially designed for production milling and boring of pockets, slots, angles and compound angles up to 90° without disturbing work in the machine. The sturdy spindle is carried in two double-row radial thrust ball bearings, sealed to exclude dirt and moisture. Spindle is provided with No. 10 B & S taper, and a hole through for draw bar. Spindle has 4" vertical motion, controlled by worm and worm gear.

Motor bracket and spindle housing are one unit. Motor is anchored to rear of column with provision for belt adjustment. This whole unit is anchored to column by three 56" bolts. Loosening these permits swiveling the spindle 120° clockwise or counterclockwise, enabling milling in side of work without disturbing the set-up.

There are no power feeds and pulleys are guarded. Five speeds, ranging from 200 to 3000 r.p.m. are provided. Table surface is 8" x 24". Spindle capacity is 0 to 34". Vertical table travel is 15"; cross travel 9"; longitudinal travel 18". Power is supplied by a 34 h.p. motor.



# PNEUMATIC DIE CUSHIONS



Equip your presses for deep drawing work for as low as \$50.00 complete.

Write for Engineering Data on Deep Drawing Die Work.

DAYTON-ROGERS MFG. CO. MINNEAPOLIS, MINN. 186



### THE GUARDIAN OF TOOLROOM COSTS

The Oliver Die Making Machine WILL REDUCE your costs.

Permit you to use LESS SKILLED help on your DIES, GAGES, etc.

Eliminate those bottle-necks.

Assure more accurate work at greater savings.

Give you more stampings per die, because of greater accuracy.

"SEND FOR DETAILS"

### OLIVER INSTRUMENT COMPANY

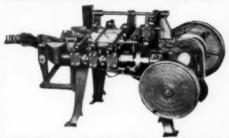
1408 E. Maumee St.,

Adrian, Michigan



Cut illustrates S-1 (9 styles available)

# DOES YOUR METAL AND WIRE FORMING MACHINE HAVE THESE FEATURES?



- Open construction of press and forming tools.
- Patented slide feed with an independent camoperated wire gripping device.
- Power operating wire feed is transmitted through a straight line.

The NILSON AUTO-MATIC Metal and Wire Forming Machine meets Today's industrial require-

ments. Engineered with a 50-year background of experience in designing and building metal forming machines, this S-3-F machine is setting new records in speed and uniformity of products.

Write TODAY for information on all types of metal forming machines

The A. H. NILSON Machine Co.

# Mechanics Through the Ages

### TO TURN OUT PULLEY

BLOCKS RAPIDLY ENOUGH TO EQUIP BRITISH SHIPS BATTLING NAPOLEONS FORCES AT THE TURN OF THE 19TH CENTURY, ENGLANDS THREE GREAT, MECHANICS, BENTHAM, BRUNEL AND MAUDSLEY, DEVISED, BUILT AND OPERATED AT PORTS MOUTH, ENGSLAND, JUM MACHINES WHICH SAWED BORED, MORTISED, SHAPED, SCORED. RIVETED, DRILLED, TURNED AND POLISHED ALL PULLEY PARTS ON AN INTERCHANGEABLE BASIS. FROM THESE MACHINES STEM MANY MODERN MACHINE TOOLS





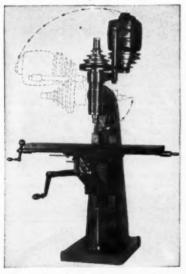
HE WORD BUFFING PROBABLY DERIVE FROM BUFFALO BECAUSE THE HIDE OF THAT ANIMAL, IT APPEARS, WAS ORIGINALLY USED BY THE SPANIARDS IN HAND POLISHING AND BURNISHING METALS.

MACHINISTS FIRMLY BELIEVED THAT THEY WOULD HAVE TO USE MACHIFYING GLASSES TO SET THEIR CALIPERS TO THE 0.01 OF AN INCH DIVISIONS WHICH APPEARED ON THE STEEL RULES THAT REACHED THE MARKET IN THE 1850'S



### Univertical Bench Milling Machine

A milling machine that can take over all the small jobs and lots of the work that has to be done normally by machines costing much more, is announced by J. D. Duffy & Son, 544 Insurance Exchange Bldg., Detroit, Mich.



The Univertical mills, drills and bores—and is an efficient contour miller. It mills an 8" x 16" die at one setting and is designed for the use of cutting tools up to 5\(^5\_8\)". Can also be adapted to small grinding operations.

It is a bench type machine with a base 11"x17", powered by a heavy duty ¼ h.p. motor, with a four-speed V belt pulley, providing a range of from 850 to 3400 r.p.m.

The swivel head spindle swings and is graduated to a range of 90° either side of the perpendicular. Overall height is 37". Maximum lift of table to end of spindle is 10", with a work clearance of 6½" from centre of spindle to supporting column.

# GOOD NEWS ABOUT Universal DRILL BUSHINGS & SCREWS



Universal Screws made from nickle steel and cadmium plated, are now available in boxes of 100 and may be ordered for your stock room. Universal Drill Bushings are superfinished to insure accuracy and unexcelled wearing qualities. Made to A.S.A. Standards, available in all standard sizes.

# UNIVERSAL

Engineering Company Frankenmuth, Mich.

# New Britain UNIVERSAL VISE

Swivels 360 degrees horizontally, 100 degrees vertically, to give any angle or compound of angles.



NEW BRITAIN TOOL & MFG. CO. NEW BRITAIN, CONN., U. S. A. The table, 24" x 4-7%" with T slots, has a cross travel of 17" with a forward and back travel of 7", with all table movements graduated to .001".

The spindle, set in end and side thrust, bearings has take up adjustments on gibs and collar. It is equipped with a ½" Weldon tool holder, accommodating tools from ¼" to 5%" in diameter. All movements are checked to .001".

### Mercury Electric Counter

A small electric counter, developed especially to meet the demand for a dependable magnetic counter at low cost, is announced by Production Instrument Co., 704-14 W. Jackson Blvd., Chicago.

It has a very small energy requirement (about 2 watts at rated voltage) which insures long life to switch contact points and makes the instrument particularly suited for electric eye operation. They are tested at 600 counts per minute.





Tamper-proof construction, non-reset feature, totally enclosed assembly, small size, convenient mounting, and attractive appearance adapt these counters for built-in applications.

Five number wheels record up to 99,-999 and repeat. Large white figures on black wheels are located close to the plastic window for easy reading.

They are available for any 60-cycle a.c. voltage up to 230, and for any D.C. voltage up to 115.



## Duplex Punch and Die Filing Machine

Files dies on upper table, punches with heels on lower table. Stroke fully adjustable to suit punch flange, from 0.1½\*. Die Table tilts at any compound angle.

### Angle Master Sine Vise

The all-hardened, ground and lapped Precision Vise for

LAY-OUT, GRINDING and INSPECTION

See them at the Metal Show, Booth C-9, Cleveland, Oct. 21-25, or write for literature and prices today.

MARBURG BROS., INC. 88 WEST ST., NEW YORK, N. Y.



BENDING

## WHITNEY-JENSEN

METAL TOOLS



All of our bending brakes are now equipped with hardened jaws which is practical in the forming of stainless steel. Write for complete information.



WHITNEY METAL TOOL COMPANY 115 FORBES ST., ROCKFORD, ILLINOIS

### Mechanical Giant Knows the Angles

Typical of the ingenuity of modern industry's machine tools is this new fully - automatic boring apparatus used in machining Lincoln - Zephyrengine blocks. It dominates the machine shop of the Ford Motor Company's Lincoln division in Detroit.

In one swift operation, this machine establishes the 75° angle for all 12 cylinders of the V-type engine. It performs this boring operation with almost the finesse of

a watchmaker-in fact, the mechanical giant knows its angles so well it is



accurate to within 1/1000 of an inch, performing swiftly and surely.

# PRECISION TOOL BENCHES



Many different styles, all with numerous drawers for storage of precision instruments. Used in many of the large shops and plants throughout the country.

All benches are solid and massively built. All drawers run on metal runners. Available with linoleum top at slight extra cost. We have been making benches since 1885. They are reasonably priced for such high quality materials and workmanship.

We also make special benches to your specifications.

Write TODAY for catalog and prices on our complete line.

J. H. ROSBERG MFG. CO. CHICAGO, ILL.

### Skilsaw Announces New 1/2" Drill

A new ½" drill is announced by Skilsaw, Inc., 5035 Elston Avenue, Chicago. Known as the Model 80, it has many unusual features of compactness and light weight and in addition, 100% antifriction bearing construction.



It weighs 8 lbs., is 11½" long overall and 9¼" high. The makers emphasize that streamlned designed is an important factor in achieving the balance which means easier handling of the drill in all positions particularly in tight places. Every moving shaft is mounted on friction-free ball or needle - roller bearings. Helical - cut gears give smooth performance. The 2-pole safety switch has 100% overload capacity.

A powerful universal motor assures rapid drilling. No-load speed is 450 r.p.m. and full-load speed, 300 r.p.m. Drilling capacity in steel is given as ½" and in hardwood 11/4".



MODERNIZE present equipment with a RUSSELL BORING BAR. Bores 9/16\* to 12\* dia. with boring axis parallel to shank axis. One compact tool, with micrometer adjust-

RUSSELL BORING BAR CO.



# QUICK, DURABLE REPAIRS

Use RUGGEDWEAR RESURFACER for patching or resurfacing entire areas . . . indoors or out. Amazing wear resistance. Made with Chrysotile and Cellulose. No chipping or cutting required. Simply sweep, mix and trowel on. Knits permanently to old surface . . . leaves no joints or crevices to become chipped or clogged with dirt. Provides firm, smooth, durable, silent wearing surface immune to heavy traffic. Resilient and non-tiring—adds to plant and worker efficiency. Dries fast.

Costs only 10 to 14 f

Costs only 10 to 14/per square foot.
Latest HAND BOOK
OF BUILDING
MAINTENANCE
sent FREE when requested on business
letterhead.



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	DECEMBER .
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FLEXROCK COMPANY
2305 Manning St.
Philadelphia, Penna.

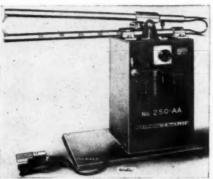
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### 50 KVA. Long-Horn Eisler Welder

The Eisler Engineering Co. of 762 So. 13th St., Newark, N. J. offers a long-horn spot welder No. 250-AA for deep sheet metal work. An unusual feature is that both upper and lower horns can be lengthened or shortened to meet the requirements of the size and type of work. The new horn adjustment makes it possible to weld light and heavy work and deep metal parts. The markings on the horn represent the KVA. ratings. The model illustrated is a 25 to 50 KVA. air operated welder.

The welders are made with many different styles of electrodes, and in this case, the cool-

ing water goes through the entire horn. Eisler spot welders are made for foot, air, or motor operation and will weld from 30 to 150 spots per minute, depending on nature of the work. Avail-



able in three sizes:—5 to 25 KVA., 25 to 50 KVA., and 40 to 75 KVA. with horn lengths of 30, 36, or 40 inches. Various types of fixtures and attachments are supplied when required for particular problems.



#### ETCHERS and DEMAGNETIZERS

Let us tell you the many advantages of our new D. C. and A. C. models now available. Also, see our new line of Magnetic Parallels and Midget Chucks.

Send TODAY for latest circulars

PRINTZ ELECTRIC CO.

14595 KENTUCKY AVE.,
BETROIT, MICHIGAN

# CLEAN and DRY YOUR COMPRESSED AIR at LOW COST!



You can eliminate costly troubles arising from moisture, oil, dirt and fine scale in your compressed air and gas lines with an ARIDI-FIER.

Low in installation and maintenance costs, this simple, fool-proof unit removes moisture, oil and other contamination, so destructive to air powered tools and equipment from compressed air lines in a comtinuous automatic operation.

Air borne solids and liquids, harmful to valves, pistons and other working parts, are impinged upon the vanes of rapidly rotating rotors and are removed by centrifugal force.

Write today for Bulletin 939, free trial offer and list of users.

LOGAN ENGINEERING CO.
4916 Lawrence Ave., Chicago, III.
Offices in Principal Cities

ThEARIDIFIER

### Whistler Adjustable Die Sets

A great aid in reducing time required to get into production and at the same time, answering the problem of eco-nomical dies for perforating and notching sheet metal is the recent introduction by S. B. Whistler & Sons, Inc., 748 Military Road, Buffalo, N. Y. of their Universal 100% adjustable die sets. Made in various sizes, these adjustable die sets are said to permit closer grouping of punches and strippers than is possible by other methods. For example, Paul and Beekman, division of Philadelphia Lawn Mower Mfg. Co., recently had the problem of producing quick-

ly, a limited quantity each of some 30 airplane wing and fuselage sections, some of these sections requiring more than 50 perforations. Conventional diemaking methods would have consumed weeks of valuable time, to say nothing of the cost. It is asserted that these new adjustable die sets, though specially made, were set up within 3 weeks' time, ready for production, and for much less than the cost by other methods.

Once in possession of the user, these adjustable die sets may be rearranged as often as the manufacturer desires. Various sizes of punches for perforating and notching can be arranged in different positions to suit the requirements of the job in hand.

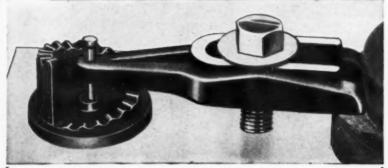
Available in stock sizes from 0 to 1½", most punching arrangements can be made up without loss of time, and, because of compact design, press operations are reduced to a minimum through close grouping of a larger number of dies in a given area. In the foreground are shown several of the



airplane parts perforated by Paul and Beekman with these adjustable die sets.



# **K-O Adjustable U-Clamps**



K-O Adjustable U-Clamps are made in 3 styles and six sizes. Cut shows our No. 4 for ½ or ¾ in. bolt. Price \$1.25 each.

Send for circular showing all sizes, specifications and prices.

K-O PRODUCTS CO.
BENTON HARBOR, MICHIGAN

### **Berkeley Multi-Speed Drives**

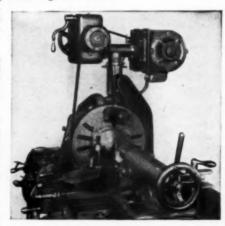
New machine tool drives incorporating 3 or 4 speed selective sliding gear transmissions are offered by The Berkeley Equipment Co., Corry, Pa.

These new drives embody the distinctive welded steel bracket support mountings characteristic of Berkeley drives and are designed for the specific tools with which they are to be used.

The alloy steel transmission gears are of generous proportions, heat treated and pack-hardened for maximum service. The gears are shifted by yokes, sliding on shafts in top of transmission, operated by a single external shift lever, located within easy reach.

On high speed, the drive is direct, with no power being transmitted through the gears. An interlock prevents meshing more than one pair of gears at a time.

A simple and positive means is provided for adjustment of belt tension.



The Berkeley line includes drives for all types of machine tools and for all kinds of service.

### Schauer High Production Speed Lathe

In many plants, heavy, expensive bench lathes are often diverted from their intended functions and em-ployed in light finishing operations-such as burnishing, lapping, burring, or polishing of small parts-which can be performed more speedily, more efficiently by machines specifically designed for that purpose.

In these busy times, a new high production speed lathe. featuring continuous motor operation should be comed and it is made by

Schauer Machine Co... 2064 Reading Road, Cincinnati, O. Collet and spindle are magnetically controlled and are engaged or disengaged by foot-control.

Employed in the final finishing of ball bearing races, headless set screws, gears, pinions, pulleys, spinning rings, screw machine products of all kinds,



wire drawing dies and numerous other small parts, this new speed lathe is credited with a substantial step-up in production, with an accompanying improvement in quality.

Special, built-in features are available to handle rods, tubes, and chuck stock or parts with the same degree of

efficiency.



**Drop Forged Steel** 

Headquarters for Standardized Die Sets, embodying many exclusive features and embracing more than 195,000 stock sizes and 46 different styles. A die service that is unsurpassed. Let us prove it!

Send for our new 336 Page Catalog.

E. A. BAUMBACH MFG. CO.

1810 So. Kilbourne Ave.,

CHICAGO, ILL.



PANTO COMBINED ENGRAVER and ELECTRIC **ETCHER** 

Compact pantographic bench-type machine, with interchangeable heads, for wide range of small work. Illustration shows engraving head attached.

#### CUTTER GRINDER

Accurate inexpensive unit for sharpening single-lip engraving and routing cutters.

#### **MASTER COPY TYPE**

Plastic-molded for 3-dimensional, and brass for 2-dimensional and 3-dimensional engraving and die-cutting machines.

#### **CUTTERS AND ENDLESS BELTS** FOR ALL TYPES OF **ENGRAVING MACHINES**

· Write for Literature

H. P. PREIS ENGRAVING MACHINE Co. 157A SUMMIT ST., NEWARK, NEW JERSEY



### McMAHON

Adjustable Angle Plate For grinding any

FRANK McMAHON CO., 142 JUNE ST.,

### Pomona Redesigns Line

The Pomona Pump Co., 559 East Commercial St., Pomona, Cal., announces the complete redesign of its line of 6" medium capacity vertical turbine pumps. As a result of improved



WADE BENCH PROFILER

For rapid production in recessing and slotting operations.

### WADE TOOL CO.

WALTHAM,

I-I MAS

ALSO WADE BENCH LATHES AND HAND KNURLING TOOLS

engineering practice, particularly in the newly designed impellers and seats, the manufacturer states that the new models afford higher efficiency and better performance, resulting in lower cost for the user.

For a desired capacity of 100 g.p.m. against 110 ft. lift in a well and 50 lbs. pressure above, a 7½ h.p. motor is required, as against a 10 h.p. motor with the old model.



# FAMCO ARBOR PRESSES FOOT PRESSES

Scientifically designed, accurately machined from selected materials.

40 STOCK SIZES and MODELS (bench and floor types). Immediate shipment from stock.

Write for prices and literature

FAMCO MACHINE COMPANY
1320 18th St., Racine, Wis.



A new double safety guard for all sizes and types of punch presses is offered by Quality Hardware & Machine Corp., 5849 North Ravenswood Ave., Chicago,

Simple in construction and easily installed, this device embodies a sweep guard, actuated by the plunger of the press. It forces hands out of the way, clearing the danger zone on each stroke of the punch. Both hands are free at all times to insert or remove work. The sweep crosses the entire danger zone before ram is half way down. Stationary guards at the sides prevent operator from working behind the sweep guard. Starting position of the guard is adjustable. There are only two points of attachment to the press-two moving parts-no holes to drill.

The makers point out that the guards increase production by giving the operator full assurance of protection from injury.

It is indorsed by large users of power presses, as well as by factory and insurance inspectors.

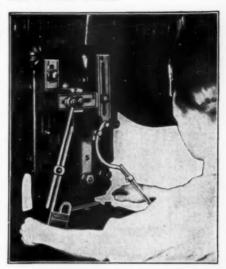
### **Small Governor Controlled** Motors

Universal governor-controlled motors, available in sizes from 1/50 to 1/20 h. p., are offered by Westinghouse. These motors meet the need for a wide range of applications for quiet, constant speed, lightweight motor drives.

They are equipped with rotating contact or hinge type governors, or may have supporting arms for special type governors. Die cast housings of aluminum alloy make the motors extremely light.

Copies of leaflet F-8498 giving full details, may be obtained from Dept. 7-N-20, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

### "Modern" Safe-T Press Guard



### Having difficulty holding tolerances?

Demand the ROLLER DRIVE Floating Holder TAPS and REAMERS

- · AUTOMATICALLY compensates for machine spin-dle misalignment, chiminating over-sized or bellmouthed holes.
- Helps produce unbeliev-able accuracy on both new and old equipment.
- Furnished with male or female taper. Straight, threaded or special shanks to fit any machine used for tapping or reaming.

W. M. ZIEGLER TOOL CO. Marantette & 12th Sts., Detroit, Mich.

SHAFT

SIZE HAND:



The only 3-way reading precision indicator. Accurate in either direction. Feeler mounted in centered cone bearings. .014 reading. New improvements.

Price \$5.00 Write for folder.

J. R. Reich Manufacturing Co. 334 Triangle Ave., Dayton, Ohio



PENCIL - SIZE HANDPIECE

Here's a low-priced, ingenious electric tool to save you time and money. Pencil-sized handpiece gives you deftly controlled power at your finger tips\_allows you to keep work well in view\_provides easy accessibility to hard-to-reach places\_simplifies numerous jobs.
HUNDREDS OF USES. Grinds,

polishes, drills, mills, engraves, sharpens, slots, removes rust, saws, carves, cleans, sands, etc. Over 200 different cleans, sands, etc. accessories available\_interchangeable almost instantly. Since 1922 FORE-DOM TOOLS have been quality-tested and proven by thousands of expert craftsmen the world over.

COMPLETE PORTABLE FLEXI-BLE SHAFT WORKSHOP, as PENCIL illustrated, including \$1 50-piece accessory

set, only Many other models available in beach and suspension types. FREE CATA-LOG No. H upon request.

FOREDOM ELECTRIC CO. Dept. 175, 27 Park PL, N. Y.

### Willey's Revises Prices

Willey's Carbide Tool Co., 1344 W. Vernor Highway, Detroit, announces a new 40 page catalog which shows new low prices on standard Carbide tipped tools, shell end mills, reamers, core drills and standard blanks.

Also prices and complete specifications on rest blades tipped with Carbide for centerless grinders.

Charts are shown on the various grades of metal they manufacture, as well as their relative hardness, and applications suitable for each grade. There are also a number of tables and charts. which are important to users of Carbide tools.

### Lower Prices on Kennametal

The McKenna Metals Co., 135 Lloyd Ave., Latrobe, Pa., announces new low prices on standard Kennametal steelcutting tools and blanks in its price list No. 4. It is explained that very substantial savings up to 60% are made on these standard tools and blanks. feature of the new schedule is that low prices prevail for the general small user. In fact he can now buy Kennametal tools at prices comparable to high speed steel tools.

### Capewell Hack Saw Blades

The Capewell Mfg. Co., Hartford, Conn., have completed installation of new and improved equipment for the manufacture of hack saw blades of all sizes and types. The past several weeks have been devoted to research work and a thorough testing of preliminary production. In the very near future Capewell will be in full production.



### Hardinge Anniversary Bulletin

A handsome new 8-page bulletin commemorates the Golden Anniversary of Hardinge Brothers, Inc., Elmira, N. Y. The theme of the piece is presented on the initial page, with an appropriate setting in gold bronze. Large pictures of all the Hardinge Precision machines are printed in a special varnish ink which shows the details with almost the fidelity of glossy photos. The brief text presents essential facts.

### Illinois Presents New Pyrometer

A new pyrometer has been developed by Illinois Testing Laboratories, Inc., 150 W. Hubbard St., Chicago, which can be used or checking oven temperatures, thermostats, etc. It employs a millivolt meter type pyrometer, having a 2-5%" scale and can be furnished



either in a range of 0-500, 0-600 or 0-800 degrees F. It is flush mounted in the stand, having exposed binding posts to accommodate the thermo-couple. The thermo-couple generally furnished, is No. 18 gauge wire with machine wrapped asbestos insulation which can be furnished up to 36". The instrument is offered complete with thermo-couple up to 36", and manual zero adjusting screw to permit resetting of the pointer for room or cold end temperature. It can be furnished with an internal automatic cold end compensator if desired at extra cost.





where lifting is done manually or with chain blocks . . . They speed the work, reduce waiting time of men and machines, and promote efficiency . . They are the first step towards mass production methods! "Budgit" Hoists come in sizes to

"Budgit" Hoist come in sizes to lift loads up to 250, 500, 1000, and 2000 pounds with speeds to suit today's tempo . . You can afford "Budgits"! Prices start at \$119. and there's nothing else to buy . . You simply Hang up, Plug into the nearest electric socket and use!

Send for catalog containing complete information, also "Time Savings Calculator" that shows savings they earn

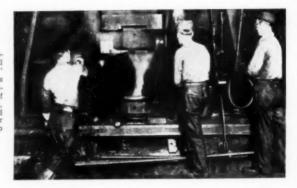
## SHAW-BOX CRANE & HOIST DIVISION

435 BROADWAY . MUSKEGON, MICHIGAN



Makers of all types and sizes of Electric and Hand Operated Cranes and Electric Hoists... Send all your crane and hoist inquiries to "Shaw-Box"!

Portable Electric "BI INGIT" HOISTS Occasional swabbing of dies with oil containing "d a g" colloidal graphite is said to have elimin a ted a sticking of deep forging work, improved finish, and reduced die wear and heat at Kropp Forge Co., Chicago.



#### Geometric Chaser Grinder

Several types of grinding fixtures are made by The Geometric Tool Co., 3

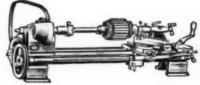


mand for a single purpose chaser grinding machine—for the sole purpose of resharpening chasers—on chamfers and cutting faces, and doing it well.

In connection with this unit, the makers point out that chasers which are accurately sharpened before becoming dull, outlive chasers that are run until dull and then resharpened free hand. Aside from getting better threads in that way, it is asserted that users get enough more threads to repay the purchase price of the machine. A bulletin gives full details.

### Model 40 Armature Lathe

A new No. 40 armature lathe has been developed by Zoerman - Clark Mfg. Co., Inc., Jackson, Mich. It ac-



Valley St., New Haven, Conn. These can be mounted on most universal surface grinders and used for chaser grinding.

However, there has been insistent de-

commodates all armature and starter shafts. Bed is 26", with 18" cutting range and 6" swing. Take-up gibs and slide-ways are machined to 60°. Compound swivels 360°. Can also be used for light metal and wood turning.



# **DOUGLAS MILLER No. 0**

## Plain Horizontal Milling Machine

with automatic longitudinal screw feed, arranged for direct motor drive.

Working surface of table 27½"x8" 12 spindle speeds\_\_\_90-1142 RPM Net weight\_\_\_\_\_1550 lbs.

DOUGLAS MACHINERY CO., Inc. 150 Broadway New York, N. Y.

# A little CERROMATRIX saves a lot of fitting and filing

America's tremendous defense program makes it more than ever necessary to consider the time element in product design. Astonishing savings in time can be accomplished with CERROMATRIX in anchoring stationary machine parts that ordinarily require costly drive fits. Quick, accurate alignment of bushings for shaft bearings is another important use for this versatile alloy. The simple procedure for both is described in detail in a valuable 36-page booklet—The CERROMATRIX MANUAL. This manual is literally packed with information needed in every progressive metal-working shop that is interested in saving and making money. Send for your free copy today.



CERRO DE PASCO COPPER CORPORATION

British Associates: Mining & Chemical Products Ltd.; London Canadian Distributors: Dominion Merchants Ltd., Montreal

\$2.50

DOUBLE

#### THE PRECISION UNIVERSAL TOOL HEAD



brings all adjustments under absolute micrometric control of the operator without stopping tool or machine. In Jig Borer, Milling Machine or Horizontal Boring Mill, it bores, faces, counterbores, turns outside diameunder-cuts, recesses, back-faces and does an almost limitless range of "headache" jobs. Send for bulletins. Address all communications, inquiries and orders to

THE PRECISION TOOL COMPANY P. O. BOX 155, BROOKLYN, NEW YORK Address: "Pretool-New York" Tel: MAin 4-1064

#### The New Giant Kippcaster

The Madison-Kipp Corp., 207 Waubesa St., Madison, Wis., announces a new die machine for zinc alloy. It is known as the Giant Kippcaster Model No. 500 to differentiate it from the Standard Kippcaster which has been produced for many years.



In general terms, the new unit is about twice as large as the standard. The weight of the Giant is more than four times that of the standard to provide the added strength needed for handling substantially larger parts than can be cast in the Standard Kippcaster.

Whereas the Standard Kippcaster is fully pneumatic, the Giant Kippcaster utilizes a combination of hydraulics and air. The die head ram is operated

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Guaranteed comfort-and we mean it. Latest colored tile combination tub and showers-newly furnished and decorated thruout-You'll like it.

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ELIE ESCALLIER. Mar.

hydraulically through a special toggle arrangement, actuated by hydraulic cylinder. The standard hydraulic system is the Vickers combination pump mounted on a 1-1/2 h.p., 1200 rp.m. motor. The standard die head is 8" x 10", but clearance is provided so that larger dies can be applied. Both the stationary and the movable dies may be of two standard thicknesses either 3' or 4".

The stroke of the machine is 8-1/2 and when a standard air cylinder of 7-1/2" is provided with a standard metal plunger of 1-34", 1836 lbs. of pressure is exerted on the metal when the air pressure is 100 lbs.

The gooseneck with standard plunger has a capacity for shooting a 3-1/2 lb., casting in zinc alloy and the pot ca-pacity in zinc is 200 lbs.

The length of the machine is 8'-1". width is 3'-8" and height is 6'-2". Weight is 6,500 lbs.

The main castings of the Giant Kippcaster are made of high strength Meehanite A iron and this is also true of the metal pot and gooseneck. power parts are made of heavy cast steel.

### Fray Memo Book

A handy pocket memo book has been issued by Fray Machine Tool Co., Glendale, Cal. The book is 2-58" x 41/4" in size, bound in substantial simulated leather and contains 72 pages. "All-Angle" milling machines, milling attachments and accessories are illustrated and described. An index makes it easy to find all of the items. Instructions and operating hints are given, and there are some blank pages for memoranda.

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● The pulse of the city—Michigan Boulevard. Chicago works and plays to the tune of its rhythmic hum. In the most convenient location on this famous thoroughfare, Hotel Auditorium provides spacious pleasant rooms, excellent service and superb cuisine, at reasonable rates.

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If those are the things you demand in a good hotel, you'll like Hotel Lafayette.

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Single.......\$2.50 up Double...... 4.00 up Special rates for 4 or more.

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ote LAFAYETTE

# A CLAMP for Every Purpose



Forged Steel Quick Acting Deep Reach Welders



Sizes Available: 3/4" to 10' opening 1/2" to 16" deep

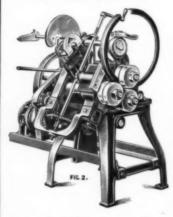
Write for CATALOG and PRICES on Clamps for all purposes as well as many other tools for use in the Machine Shop.

IN STOCK AT YOUR SUPPLY HOUSE

The Cincinnati Tool Co.,

1945 WAVERLY AVE., CINCINNATI, OHIO

# EXCELSIOR No. 14 ANGLE ROLLING MACHINE



Capacity 2x2x¼ Angles. All the rolls are direct driven avoiding slipping of the material between rolls, which are operated by the oversize Excelsior friction clutch. Write for Price and Testimonials.

We specialize in Automatic Grinding and Polishing Machines, to polish Stainless Steel Sheets, Automobile Bumpers, and parts, Stove and Range Top Castings, Electric Iron Sole Plates, etc.

Also Inside Cutting Shears, Deep Throat Power Punches for duplicate work by the use of horse shoe templets up to No. 12 gauge. Used in Stove, Range, Air Conditioning and Kitchen Equipment Plants.

# TOOL & MACHINE CO.

East St. Louis, Illinois

### Variable Speed Polishing and Buffing Lathe

A new addition to the Hammond of Kalamazoo line of polishing and buffing lathes is the model "VRO" Variable Speed Machine.



It has an "overhanging" spindle, the front section overhanging 12-½" from lower front of base and is especially desirable on large bulky pieces.

Speed change of 1500 to 3000 r.p.m. can be obtained merely by turning the hand wheel, is accessible from the front of the machine. The indicator at the side of the hand wheel indicates the speed at which the lathe is running.

For particulars address Hammond Machinery Builders, Inc., 1614 Douglas Ave, Kalamazoo, Mich., and for those who are attending the National Metal Show at Cleveland this machine will be in operation at Booth Z-111.

### Bliss Hydro-Dynamic Press

The "Bliss" 800-200 Ton Hydro-Dynamic press shown offers simplicity of its cycle, smoothness of operation at high speed and economy of operation and maintenance. It is of the double action type with universal electric control and is equipped with an auxiliary hydraulic pressure cushion in the bed. Two 125 h.p. motors operate the press at high speeds.

The push button control is such that the inner main slide cannot contact work until after the desired blankholder pressure is applied by the outer

slide. The main drive brings the two slides simultaneously to the work, the inner slide halting for a fraction of a second while the blankholder pressure is applied and then proceeding at the draw speed. Reversal may be controlled either by slide position or by pressure in the system. Positive inching for die setting is by means of push button with the quick advance speed eliminated, permitting increments of approach of h" or less.

The press features close fitting gibs, the "Bliss" normally open prefill valve and holding valve. Eliminating cavita-tion and allowing the machine to purge itself freely of air is said to give fast generation of pressure.



Equipment is self-contained throughout comprising air filter, oil filter, oil strainers, circulating oil cooler and indicating oil temperature gauge.

Capacity of the main slide is 800 tons: capacity of blankholder slide, 200 tons; capacity of cushion in bed, 150 tons; bed area F. to B.xR to L 84"x85"; distance top of bed to face of blankholder slide with slide up 95"; with slide down 69"; maximum strokes of main slide 42"; overall height 340". Address Hydraulic Division, E. W. Bliss Co., 53rd St. and Second Ave., Brooklyn, N. Y., for further details.



To meet increased demands two ACE Automatic Welders were added in the above plant, operating 24 hours (3 shifts) and paid for themselves in two months.

### As Production Tools-SPOT WELDERS Increase Output

Spot welding will save time and costs-no holes to pierce, no rivets to handle, no preparation. One operation only is required for spot weld-ing metal sheet and wire products—improving appearance and strength since spot welding takes nothing away and adds nothing.

Modern production tools-ACE Welders-are

Autolite, Midland Wire Products, Curtiss - Wright, and they will do the same for you.

Peer-engineered Welders provide the latest features for fast production and uniform high quality welds at lower costs.

Improved latest designWelders-manuautomatic and types-fully describ-ed in New Bulletin Write for a 40-H. copy today.



Catalog 40-H Copy Free on Request

Pier Equipment Mfg. Co.

900-20 Cross Street Benton Harbor, Michigan







# "NO WORRIES FOR ME When I'm Using PUTNAM TOOLS"

The men who see Putnam Tools in daily use can tell the real story of how fast they will cut . . . how long they will last . . . and how valuable they can be in helping to keep production rolling without interruption.

Get the opinions of the men who operate your machines . . . then be sure you have full information on the entire Putnam line of High-Speed End Mills, Continuous Pilot Counterbores and Spiral Fluted Chucking Reamers. Our complete catalog—which includes all prices—will be sent to you immediately upon request.

# PUTNAM TOOL COMPANY 2983 Charlevoir Ave., Detroit, Mich

### Washer Stock List

The Wrought
Washer Mfg. Co.,
2224 So. Bay St., Milwaukee, Wis., announces publication
of a new Stock List—
No. 55-D—available
to manufacturers upon request

on request.

This new publication lists thousands of washer specifications in various materials, including steel, brass, copper, aluminum, fibre, etc. carried in actual inventory, available for immediate shipment. Those sizes permanently maintained in stock are so designation of the steel o

stock are so designated, thus enabling manufacturers to select for standard production as well as new assemblies the particular sizes on which they can always obtain prompt delivery.



#### The Fell Precision Level

A precision, "all-way" level for use in machine tool building, setting up, and maintenance, whether for establishment of level working surfaces or for the accurate checking of straightness where true level itself is not required is offered by Wm. B. Fell Co., 700 South St., Rockford, Ill.

The ordinary precision level reading in .0005" per foot shows only .0015" on the glass. The Fell Precision Level, while easily read to .00025" per foot shows .005" per foot.



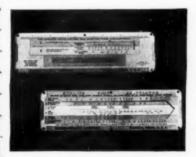
The Fell graduations are in .0005" per foot, and form squares about a circular bubble, thus giving coordinate readings showing the direction and amount of slope, if any,

Unlike ordinary levels, the graduations are on the side of the glass toward the bubble. This eliminates error in reading and allows the use of heavy glass (½") which is not subject to the temperature distortion or breakage of a thin tube.

Mount is of heat-treated cast iron, lapped flat by optical methods and substantial enough to stay flat. The glass assembly is mounted solidly upon a spherical surface which is an integral part of the base casting. Four thumb screws under the cap give easy adjustment by shifting the assembly upon this curve.

### Hobbing Time Calculator

A slide rule, designed to simplify the calculation of hobbing time, has been developed by the Barber-Colman Co., Rockford, Ill.



The rule contains all of the standard hob speeds that are found on Barber-Colman hobbing machines. In addition, an 8" scale is incorporated on one edge. By a slight amount of interpolation on the hob speeds, the Calculator can be of equal value for determining hobbing times on other makes of hobbing machines.

The Calculator is available, free of charge, to all time estimators, production managers, superintendents foremen, etc. who have to do with hobbing problems.

# HAMMOND

### GRINDERS

Tool, Production and Disc 1/4 H. P. to 20 H. P.



### POLISHERS

1 H. P. to 50 H. P. Single or Variable Speeds.



See HAMMOND Equipment at Booth Z-111, National Metal Show, Cleveland, October 21 to 25.

Hammond Machiner Builders

1614 DOUGLAS AVE.

### Van Norman Offers Another Horizontal Miller

Companion to the No. 2-L, recently announced, is the new No. 2-S horizontal miller built by the Van Norman Machine Tool Co., Springfield, Mass.

The No. 2-S is available, both in plain and universal types, and is designed, built and powered for maximum metal-removing capacity. The 18 spindle speeds from 25 to 1250 r.p.m. are selected by a single lever, as are the 18 feeds which have directional controls both front and rear. Power rapid traverse is provided in all directions. The table is roomy, measuring 50" x 12".

The general outlines follow the current streamlining trend, yet the machine gives the impression of stability and ruggedness.

Controls are conveniently centralized, for easy operation—an important point these busy days when every plant is striving to raise production quotas while maintaining quality.



### MODERN SHEARING PERFORMANCE

with these New Heavy Duty Bench Type Throatless Shears

Three Models of Beverly Shears are offered to fit the job. Model B-1 weighs 16½ lbs.—cuts stock up to 14 gauge. B-2 weighs 32 lbs.—handles up to 10 gauge. B-3 weighs 55 lbs.—

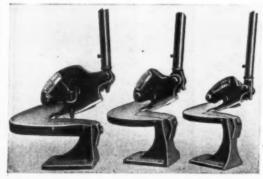
takes up to 3/16" mild or 10 gauge stainless steel.

Reasonably priced. Send for descriptive circular

## THE BEVERLY SHEAR CO.

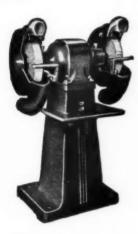
3007 W. 110th St. CHICAGO, ILL.

to



### "B-Line" Grinders and Buffers

A new line of buffers and grinders of the ball bearing, motor-in-head, heavy duty pedestal type is offered by The Brown-Brockmeyer Co., Inc., Dayton, Ohio.



Sizes range from ¼ to 5-h.p., inclusive. All of the single phase units are of the condenser type, and centrifugal switches and other possible sources of trouble have been eliminated. Polyphase types can also be furnished.

An interesting feature is the lighting arrangement. Lights are placed in the combination shade and spark arrester, giving direct illumination of the wheels. 6-volt automotive bulbs of the bayonet type are used and this construction prevents the lamps from working loose.

The standard double end grinder is shown. Other models offer extended spindles for buffing, and a long spindle end buffing unit is also available.

New bulletins give full information on the grinders, and also on the "B-Line" of Motors in capacities from 1/8 to 15-h.p.

# CUTS GRINDER RATES

The Defense Program and expanding industries demand higher production rates.

Elimination of operator fatigue is one of the first steps in raising output. When a grinder operator has to hammer, pull or pry parts loose from a magnetic chuck repeatedly, he tires unnecessarily and wastes valuable time. Tired operators cannot hold high production rates and there's constant danger of slips and mistakes. More than that, precision work may be distorted or damaged, and the chuck face may be marred.

NEU-T-ROL releases the work promptly every time and demagnetizes it. Useful on small chucks, it is essential on heavy work.

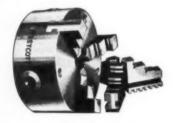


There's a NEU-T-ROL for every size of magnetic chuck. Leading manufacturers will now supply NEU-T-ROL built into your new grinding equipment IF YOU SPECIFY IT. Or you can install it easily on equipment already in service. Write for full details.

Electro-Matic Products Co.

#### "Oneida" Lathe Chucks

A new line of regular duty universal chucks has been developed by Westcott Chuck Co., Inc., Oneida, N. Y.



These are similar to the standard West-cott line but are slightly lighter in weight and equipped with one pinion. Bodies are of semi-steel and two sets of jaws are provided. Spindle mounting is by an adapter. Six sizes are offered, ranging in body diameters from 4½" to 12-1%". Full details are given in a new bulletin.

### **WOOD and METAL PATTERNS**

Accurate, Dependable Service, at lowest possible cost.

> We are equipped to serve you better.

STANDARD PATTERN COMPANY 3601 New Haven Ave., Fort Wayne, Indiana

### Capacitors Save Power Cost

Capacitors installed for power-factor correction in the plant of Ferro Machine & Foundry Company, Cleveland, manufacturers of gray-iron automotive castings, are said to have paid for themselves in 16 months by reducing total power costs 8 per cent.

With a plant load made up mostly of 220-volt, 3-phase induction motors driving air compressors, tumbling mills, and other foundry machines, power factor was so low (around 67 per cent) that an increase of conductor sizes on two feeder circuits appeared to be necessary. Load factor was about 70 per cent of connected load.

A total of 600 kva., of Westinghouse dust-tight capacitors was connected in the system; power factor increased to an average of 97 per cent; current on two overloaded feeders diminished 200 amperes; and feeder current-carrying capacity is now said to be adequate throughout the plant. Half the 600 kva is arranged in a switch house on the 2300-volt side of the transformers. The rest of the units are connected at the ends of 220-volt feeders in banks of 45 and 90 kva. The use of dust-tight units is particularly advantageous in the Ferro plant because they demand relatively infrequent inspection and cleaning.

### "Wyco" Geared Head Units

Wyzenbeek & Staff, Inc., 836 W. Hubbard St., Chicago, have speeded up their latest model Flexible Shaft Machine by placing step-up gearing di-



rectly on the motor. The Model 35A geared head unit is shown. It has a constant speed, fully enclosed ball bearing motor and is geared up to 9400 r.p.m.



For grinding in close quarters, in corners, or inside pipe or small radii, where cone shaped or small diameter cylindrical wheels are required, this machine will supply the needed speed, coupled with ample power.

Resinoid bond wheels up to 4" in diameter are recommended, and the grinding speed is sufficient for maximum results. The machine can be furnished with drum type switch wired for operation on either 110 or 220 volts. This makes it possible to operate either from the 220 volt power line or from the 110 volt light circuit at will. The machine is made in two sizes: the Model 35A with a 34 h.p. R.I. motor and the Model 45A with 1 h.p. motor. These are, of course, constant speed motors, which are more desirable than universal or series wound motors for grinding purposes, for the R. I. constant speed motors do not slow down under normal load.



LOW COST———HIGH PRECISION
PLUG GAGES



Double Life
Classes XX, X, Y, ZZ.029" — 1.00"
Also AGD Plugs .029—2½"

# IDEAN LIVE CENTERS





- Work with heavier loads at higher speeds!
- Save man-hours on centering work!
   Save cost of fast wearing dead Centers!
   Make work easy—increase production!

IDEAL Live Centers are available with one or more of the following inserts—male insert, plain female insert, and female insert with raised lands.

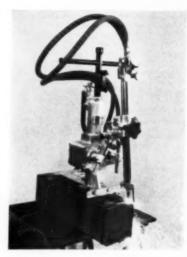
Ideal Commutator Dresser Company
1441 Park Avenue Sycamore, Illinois

#### Linde New Bar-Cutting Machine

A new oxy-acetylene bar-cutting machine, designed for heavy cut-off operations is announced by The Linde Air Products Co., 30 E. 42nd St., New York, N. Y. This portable machine, known as the Oxweld CM-35 bar-cutting machine, will cut rounds or squares with a minimum of adjustment. It is driven by a self-contained spring-power unit, the speed of which is hydraulically controlled. It is shown making a drop cut on a square billet 6" x 6" x 26".

Heretofore heavy and complicated have been attachments used straight-line cutting machines to obtain the desired blowpipe motion when cutting rounds, in which the blowpipe must move in a vertical arc, or when cutting squares with a swinging blowpipe. In the CM-35 the correct motion for cutting rounds or squares is transmitted positively to the blowpipe by an easily adjusted linkage mechanism. Hydraulic control is said to provide smooth blowpipe travel with an almost

infinite variation of cutting speeds between 1" and 75" per minute.



The feature of a self-contained power unit offers the advantage of increased portability. The cutting machine can be used indoors or out, wherever oxygen and acetylene are available, and can be moved to a new work place at a moment's notice, since neither electric power nor guide track is necessary for its operation. The CM-35 with standard equipment has a cutting range of from 2" to 10" which can be changed to a range of 8" to 15" by means of special linkage arms.



S FOR BROWN & SHARPE **AUTOMATIC SCREW MACHINES** BANNER MANUFACTURING CO. 1871 Clybourn Ave. Chicago, III.



NDUSTRIAL 730 Hennepin Ave..

YOU CAN INCREASE THE LIFE OF YOUR POWER HACK SAW BLADES and at the same time increase cutting efficiency.

\$24.75 "QUICK WAY" HIGH SPEED POWER HACK SAW BLADE GRINDING FIXTURE includes one special grinding wheel, designed to be attached to any Universal Tool Grinder, or a Cutter and Reamer Grinder. Each blade can be reground five or more times. For further details write

ENGINEERING CO., Pence Building. Minneapolis, Minnesota



Full floating; simply adjustable; easy and quick set-up; die can be run on to work before tightening flange; accurate concentric alignment; large openings for chip elimination and proper lubrication; dies securely held; perfect threads; no taper threads; spot inspection only; few rejections; uniform wear, as cutting is made with every lead of die; dies last longer; increased production at lower cost; These features make this tool the first choice of manufacturers who are awake to the advisability and economy of modernizing their screw machine equipment. By completely equipping your machines with ALCO Tools, you can cure your bushing headaches, too, for no bushings are required with ALCO Drill Chucks and Tap Holders.

Write today for detailed Information.



The Alco Tool Co., 835 Housatonic Ave., B Bridgeport, Conn., U. S. A.

ALCCETOOLS



# For Getting Into Production Quickly



# use ESCO

Saves You Time-Low in Cost-Increases Production

Durable, simple and sturdy, MIJIT Drill Jigs are priced low enough to warrant the use of the number and assortment required for efficient economical production. There are four models for various types of work.

Consult us without cost or obligation if you have a difficult or expensive machining operation.

Or write for a new bulletin giving full information on Esco Drill Jigs

Esco Engineering & Sales Inc.

4855 Fourth Ave., Detroit, Mich.

### Unloading Strip From Recoiling Machines

This truck, as designed and built by Lyon Iron Works, 545 Madison St., Greene, N. Y. is arranged to run on a track at approximately floor level. with the lower portion of the truck in a pit below floor level.

This truck is of the toggle lever type, capacity 10,000 lbs., for handling coils of steel up to 46" diameter. Platform length is 45" fitted with an adjustable stop. Platform tilts 15° from horizontal, operated from the tandem valve assembly that operates the elevating and lowering of the main platform. The lowered height from track to vertex of V of platform is 13-1/2". Elevated height is 25-1/2", elevation 12". The pump is

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□Index Fixtures □Indicators
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Continued on following page

City

Keyseating Machines Knife Grinders Knurling Tools	Nut setting equip.	Router Bits	□Tap Holders □Tapping Mchy. & A: □Taps, collapsing
Lapping machines Lapping wheels, dia. Lathe live centers Lathes, auto. Lathes, bench Lathes, polishing &	Oil cups Oil and grease seals Oil groovers Oils, cutting Oils, lubricating Oils, quench. & tem.	Sanders Saws, Band Saws, Blade Saw Sharpening Mch. Sawing Machines, circular & frict.	Thread Grind. Mch. Thread Rolling Mch. Tool bits, hi. sp. st. Tool Holders Toolmakers Instrumts. Tools, boring Tools, cutting
buffing  Lathes, precision  Lathes, toolroom  Lathes, turret  Lathes, spinning  Lathes, extension bed	Patterns Pillow Blocks Pins, leader & dowl. Pipe, cutting and threading mch. Plate Rolls	Screw Drivers Saws, cir. met. cut. Screw Cutting Tools Screws, cap, set, saf. set & machine Screw Drivers Screw Mch., auto.	Tools, filing Tools, lathe & plan Tools, machinists' Tools, sawing Tracing cloth and paper
and gap  Lathes, double end  Layout fluid  Layout plates	Press Brakes Press Feeds Presses, arbor Presses, bench	Screw Mch., hand Screws Scribers Separators, oil	☐Transmission, var. sp. ☐Tube Flang. Mchy. ☐Tumbling Barrels ☐Turning Tools
Lift Jacks Live Lathe Centers Lock Form. Mch., pr.	Presses, broaching Presses, foot	□Shapers □Shafts, flexible □Shafts, hangers and	Universal Joints
Lubricants Lubricating systems	□ Presses, forming □ Presses, hydraulic □ Presses, inclinable □ Presses, power	Shapers vertical	□Valves, hydraulic □V Belts □Vises, bench □Vises, machine
Mandrels, ex. & solid Magnetic chuck de- magnetizers	Presses, punch Presses, screw Presses, percussion	Shapers, structural Shears, bevel Shears, electric	□Vises, pipe □Vises, planer & shap,
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Lincoln type Milling Mch., pl. ty. Milling Mch., univ.	□Racks, gear, cut □Racks, bar stock □Radiators, Japanning	Shop lights Sine Bars Slotting machines	□Welders, trans- former type □Welding Gen., arc
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# New Trade Literature

#### PREFINISHED METALS

Cost comparisons in production methods can be determined readily from a handy production methods kit offered by the American Nickeloid Co., 1311 Second St., Peru, Ill. Bound in a serv-iceable folder, the kit contains actual samples of prefinished metals for any specific purpose; a portfolio giving detailed recommendations and suggestions on fabrication; cost sturdy analysis sheets and tabulation forms, etc.

#### CHAIN TRANSMISSIONS

A new pocket folder on Whitney power transmission and conveyor chains is offered by Smith Power Transmission Co, 1545 E. 23d St., Cleveland, O. Specifications and information are given on standard chains, flexible couplings, silent chain, sprockets,

#### SAFETY COUPLINGS

Ermeto safety fittings and couplings are in-Ermeto safety fittings and couplings are introduced in catalog A-401 issued by The Weatherhead Co., Cleveland, O. It is asserted that a tube inserted into the Ermeto safety fitting makes a joint stronger than the tube It is especially useful in joining stainless steel, aluminum and other tubing which neither flares nor threads easily.

#### MACHINE TOOL VISES

J. E. Plunket Machine Co., 1823 W. Lake St., Chicago, Ill., offer a new folder, illustratand describing the various models of Plunket drill press, quick action, milling machine, shaper, universal and small machine tool vises.

#### INDUSTRIAL DRILLING AND TAPPING

INDUSTRIAL DRILLING AND TAPPING
Many different models of Helmet Head
drill presses are presented in a new bulletin
issued by Boice-Crane Co., 1729 Norwood
Ave., Toledo, Ohio. Several illustrations show
typical applications in the attainment of lower cost industrial drilling and tapping

#### MULTI-PURPOSE MACHINES

An unusually attractive 24-page catalog covers the Hack Multi-Versal machines which perform some 30 different cutting operationsconstituting in a single unit, almost a complete tool and die shop. They are made by Hack Machine Co., 1228 Harding St., Des

#### **MULTI-MILLERS**

Bulletin No. 40 issued by the U. S Tool Co., Ampere, (East Orange) N. J., presents 8-pages of interesting and profitable information on Millers-with specific applications in the continuous milling of form stock, rotary milling, automatic cutoff operations, automatic indexing, vertical milling and high speed grinding.

#### GAGE BLOCKS AND ACCESSORIES

Catalog No. 15 by Ford Motor Co., Johansson Division, Dearborn, Mich., gives 36-pages of interesting and profitable information on Johansson gage blocks and accessories. Many illustrations show typical uses and applicafrons of these precision measuring units

#### DRILL PRESSES

DRILL PRESSES
Bulletin No. 2989-D presents very attractively, 12 pages on the No. 22 "Buffalo," drill made by Buffalo Forge Co., 161 Mortimer St., Buffalo, N. Y. This model is available in round column or pedestal type, with sensitive or power feed and many other up-to-the minute features

#### DRIVE STUD SETTERS

A new four page bulletin in three colors presents controlled drive stud setting, the Titan way. Issued by the Titan Tool Co., Fairview, Pa., it depicts and explains the use of Titan setters in driving studs to shoulder, to the bottom of holes or to a point where

#### VERTICAL HYDRO-BROACH MACHINES

Two new bulletins, M-894 and M-886, issued by Cincinnati Milling Machine and Cincinnati Grinders, Inc., Cincinnati, Ohio. The former covers the Duplex Vertical and the latter, the Single Ram types. There are many large scale illustrations of machines and details, and complete specifications. Also photos of

# machines at work in typical applications. MICRO-SPEED LATHES AND SCREW MACHINES

New bulletins illustrate and describe the new Micro-Speed Lathes and Turret Screw Machines offered by Simmons Machine Tool Co., 1725 Broadway, Albany, N. Y. An attractive feature of both is the unusually broad speed range provided by the new

HORIZONTAL BROACHING MACHINES
A new twin 12 horizontal broaching machine is illustrated and described in an 8-page bulletin (No. 21000) issued by The Oil-gear Co., 1310A W. Bruce St., Milwaukee, Wis.

### Size Control Equipment

A line of high precision dial indicators and plug gages is offered by the Size Control Co., 35 E. Wacker Drive, Chicago, Ill.

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# Classified Section

#### TISED AND REPUILT MACHINERY

Lists of Used and Rebuilt Machinery, either For Sale, Wanted, or For Exchange, set in uniform style, will be published in the Classified Section at the rate of \$5.00 for your name and address and a five line advertisement. For additional lines. 40c per line.

Write directly to those offering the machine for sale, for prices and full descriptions. If what you seek is not advertised, write Hitchcock Publishing Company, Chicago, making known your wants on either new or used machinery and the publisher will gladly pass them along to the advertisers.

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Lattes, Hendey 14x6, 16x5, 16x6, 18x10, LeBlond 20x10.
Lattes, Rahn-Larmon, 16x5, 18x8, 20x10, 20-40x7'.9.
Lattes, L & S 16x6, 12 speed, selective geared head.
Millers, L. No. 2 universal, s.p.d., No. 4 plain.
Millers, univer. Rockford No. 23 s.p.d., No. 25 com.
Millers, univer. Rockford No. 25 s.p.d., No. 25 com.
Millers, univer. Rockford No. 25 s.p.d., No. 25 com. Millers, Ohio No. 2 plain. B & S No. OY. Vertical millers, Becker, b.b., No. 23. Turret lathes, 26" Libby 72" hole, m. d. Presses, hydraulic pumps, accumulators.

#### Bleser Machinery Company 209 N. Sixteenth St., Springfield, Ill.

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438 Oliver Bldg.

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Grinders, No. 2 B. & S.; No. 3 B. & S. univ.: m. d.;
No. 13 B. & S. univ.: 10x24 Landis self-contained;
Heald 8" rotary; No. 19-53" Besley. Lathes, 14x8 Reed l. c. taper, m. d. Springfield 14x6, s. q. c., m. d. Mills, Sundstrand h. d. hand; 8" P. & W. Auto, K. O.

Anto Shapers, 24" Gould & Eberhardt, m. d. Shears, 52 Stoll. Sleeve machine, Stolp, new. Welder, 35 K. W. Thompson, proj. type, G. & E. No. 12, s. o., m. d.

### FOR SALE BY

#### R. S. Armstrong & Bro. Co. 676 Marietta St., N. W., -Atlanta, Ga.

Compressor, 7x6 Sullivan, horiz., b. d. Compressor, 7x6 Sullivan, horiz., b. d.
Compressor, 12x19, 1-R., horizontal, b. d.
Bolt threading machines, b. d., 14" National, 2" Landis.
Drill presses, b. d., 28", Barnes and Norton.
Keyseater, No. 2 Mitts & Merrill, b. d.
Lathe, 18"x24" Bradford, l. c. g., taper att., b. d.
Lathe, 18"x24" Bradford, l. c. g., cone drive.
Lathe, 34"x36" Acme universal turret, air chuck, m. d.
Miller, No. 14 Valley City plain, b. d.
Miller, No. 4 Kempsmith plain, b. d. and feed.
Motors, electric, large quantity. Miller, No. 4 Kempamith plain, b. d. and I Motors, electric, large quantity. Pipe machine, Curtis & Curtis, 29" to 8". Shapers, 16" Barker, 24" Cincinnati, b. d. Shear, Thompson bevel patch Shear, No. 2 Bethlehem circle, b. d. Universal Woodworker, Northfield. Send us your inquiries.

#### Lang Machinery Company

Air compressors, Ingersoll-Rand XB-2, 600, 888, 1200 & 1500 cu. ft. 1001b. pressure, motor drive. Air comp., W. J. Sullivan, angle comp., 468 c. f. Air comp., W. J. Sullivan, angle comp., 468 c. f. Air comp., 14°x12° Ing. Rand `ER-1\*., 464 c. f. Bolt cutter, 1" Acme, Landis hads., 2 & 3 spdl. Bolt cutter, 1" Acme, Landis hads., 2 & 3 spdl. Bolt cutter, 2" Acme, Landis hads., 2 & 3 spdl. Bolt cutter, 2" Acme, Landis hads., 2 & 3 spdl. Bolt cutter, 2" Acme, Landis hads., 2 & 3 spdl. Boring mill., 42" Gisholt, 2 hds., r. p. l., m. d. Boring mill., 42" Gisholt, 2 hds., r. p. l., m. d. Boring mill., 42" Gisholt, 2 hds., r. p. l., m. d. Boring mill., 42" Gisholt, 2 hds., r. p. l., m. d. Boring mill., 42" N. B. P., 2 bear, r. p. m., m. d. Boring mill., 52" Bausch, geared feeds, d. c., m. d. Boring mill., 52" Bausch, geared feeds, d. c., m. d. Boring mill., 52" Bausch, geared feeds, d. c., m. d. Boring mill., 52" Bausch, geared feeds, d. c., m. d. Boring mill., 52" Bausch, geared feeds, d. c., m. d. Boring mill., 52" Bausch, geared feeds, d. c., m. d. Boring mill., 52" Bausch, geared feeds, d. c., m. d. Boring mill., 52" Bausch, geared feeds, d. c., m. d. Boring mill., 52" Bausch, geared feeds, d. c., m. d. Boring mill., 52" Bausch, geared feeds, d. c., m. d. Boring mill., 52" Bausch, geared feeds, d. c., m. d. Boring mill., 10" Niles, 2 heads, b. d.
Boring mill., 10" Niles, 2 heads, b. d.
Boring mill., 10" Niles, 2 heads, b. d.
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Boring mill., 10" Niles, 2 heads, b. d.
Boring mill., 10" Niles, 2 heads, b. d.
B

#### 28th St. & A. V. R. R. Pittsburgh, Pa.

it. & A. V. R. R. Pittsburgh, Pa.

Lathe, 28"x18' American, p. c. g., t. a., b. d.

Lathe, 36"x28' 6" New Haven, p. c. g., b. d.

Lathe, 36"x22" Schumacher & Boye, q. c. g., b. d.

Lathe, 10"x25' New Haven, triple geared, motor drive.

Lathe, turret, 10" Varner & Swasey, b. d. (.2).

Lathe, turret, 16" Warner & Swasey, b. d. (.4).

Lathe, turret, 18" Warner & Swasey, b. d.

Lathe, turret, 21"x36" Pratt & Whit, grd. hd., s. p. d.

Miller, duplex, 38, "x10" Ingensoll, m. d.

Miller, plain, No. 24 Whitney, b. d.

Miller, plain, No. 3 Cincinnati, b. d.

Miller, plain, No. 3 Cincinnati, b. d.

Miller, vertical, No. 14 Knight, m. d.

Pipe machines, Landis "to 2" belt drive, (2).

Pipe machines, Landis "to 2" belt drive, (3).

Pipe machines, Landis "to 2" belt drive, (2).

Pipe machines, 18" Williams, 28" to 3" motor drive,
Pipe machine, 8" Williams, 28" to 3" motor drive,
Pipe machine, 8" Williams, 28" to 3" motor drive,
Pipe machine, 8" Sa"x12" Cleveland, 3 hds. m. d.

Planer, openside, 38"x28"x12" O. & H. 3 hds. m. d.

Press, baling, 13-P Logemann hydraulic, m. d.

Press, baling, 13-P Logemann hydraulic, m. d.

Press, No. 58 Bliss, dbl. crk., str. 34", m. d.

Press, No. 68 Cleveland, bed 32"x22", 78 ton, stroke

24", roll feed, motor drive,
Press, ton, stroke

18"x10" Logemann, bed, 48"x80". Press, No. 98 Bliss, dbl. crk., str. 34", m. d.
Press, No. 83 Cleveland, bed 32"; 22", 75 ton, stroke
24", roll feed, motor drive,
Press, toggle, Garrison. 500 ton, bed, 48"x60".
Press, trimming, No. 2 Billings & Spencer, 80 tons,
Presse, twinsel, 100-ton Hydraulic, 33"x66".
Profilers, Nos. E3 and E4, Keller, motor drive,
Pump, Aldrich triplex, 15 gal. 2000 lb., m. d.
Pumch, lever, No. 50 No. 15 tht., 14"—1". m. d.
Pumch, lever, No. 50 No. 15 tht., 14"—1". m. d.
Pumch, lever, No. 50 No. 15 tht., 14"—1". m. d.
Pumch, lever, No. 50 No. 15 tht., 14"—1". m. d.
Pumch, 15 the No. 52 No. 15 tht., 14"—1". m. d.
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Pumch, 15 the No. 52 No. 15 tht., 14"—1". m. d.
Pumch, 15 the No. 52 No. 15 tht., 14"—1". m. d.
Porton machine, No. 52 No. 15 tht., 15"—1". m. d.
Screw machine, No. 52 No. 15 the No. 15 the, p. d.
Screw machine, No. 52 No. 15 the No. 15 the, p. d.
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Screw machine, No. 52 No. 15 the, p. d.
Screw machine, No. 52 No. 15 the, p. d.
Screw machine, No. 15 United Kng, g. 4", m. d.
Shaper, 20" Stockbridge, p. d. f., b. g., m. d.
Shaper, 20" Stockbridge, p. d. f., b. g., m. d.
Shaper, 20" Stockbridge, p. d. f., b. g., m. d.
Shaper, 20" Stockbridge, p. d. f., b. g., m. d.
Shaper, 20" Stockbridge, p. d. f., b. g., m. d.
Shaper, 20" Stockbridge, p. d. f., b. g., m. d.
Shaper, 20" Stockbridge, p. d. f., b. g., m. d.
Shaper, 20" Stockbridge, p. d. f., b. g., m. d.
Shaper, 20" Coulkers N. l. g. g., m. d.
Shaper, 20" Coulkers N. l. g., g., m. d.
Shaper, 20" Coulkers N. l. g., g., m. d.
Shaper, 20" Coulkers N. l. g., g., g., d. g., d.
Shaper, 20" Coulkers N. l. g., g., g., g., d.
Sha

#### FOR SALE BY

#### Nelson Machinery Co., Green Bay, Wis,

Drill, S ft. Bickford No. 2 radial, geared m. d. Drill, 28° sliding hd.,—H. W. L. & G. P. F.—belted. Grinder, Cochrane Bly No. 11Sauto, saw, cap. 10° to 32°, Grinder, Niles. B.P. 12x36 Universal Mfg., belted. Hobber, Harber Colman No. 12
Lathe, 36"x14"—6" L. & S. patent hd., q.c., 23/16 hole.

#### L. H. Goodnow Foundry Co. Fitchburg Mass.

BORING MILL Niles vertical boring mill, 42" table 31" rise, single pulley drive. table, 2 swivel heads,

#### H. F. Wolnick Machinery Co. 9 S. Clinton Street, Chicago, Ill.

Boring mill, S' Niles vertical, 2 threads, back drive, Generator, 6"x11" Gleason, bevel geared. Lathe, 15x6 Pratt & Whitney. No. 4 Warner & Swasey, motor drive with motor, Mill, No. 14 Becker Plain.
Mill, No. 33 Kempamith production.

Planer, Ohio, 24x24x6.
Punch and shear, #"x10' Cincinnati, motor drive.
Shaper, 24" Smith & Mills.
Turret lathe, Peirce, motor drive. #" cap.

#### Jones Machine Tool Company Front & Pike Sta., Cincinnati, Ohio

38x12' Boye & E. q. c. 18x1o' Muell 38x14' Boye & E., c. d. 18x1o' Hend 30x12' Putnam, cone dr. 18x1o' Hend 24x14' Boye & E., q. c. 16x1o' S. Boy 21x12' Boye & E., q. c. 16x1d' Seb. C. d. MILLERS & GRINDERS

No. ? Kemps. plain.c. d. No. 2 hvy. B. S., pl., c.d. No. 24 Ohio pl. c. drive. No. 3 Standard pl. c. d. 24x8' Ingersoll slab mil. Ingersoll slab mil PRESSES

No. 6-H Toledo, incl.
No. 17 Stoll, inclinable.
No. 5 Toledo, inclinable.
No. 21 Bliss, incl.
No. C5 Ferracute incl.
No. 75 Niagara arch.

10'-10 G. Oh! Pr Brake. No. 253 D. & K. Press Brake 37" bet, housings, m. d. 52" Verson Press Brake,

m. d. No. 5963 D. & K. Press Brake, 5', 6" bet. hous-ings, m. d.

Planer, 24x6 Gray, Ohio I head, Ingersoll Tab Grinder, 34" Gisholt vert, boring. "Gisholt vert. boring, mill, I hd. rap. traverse

LATHES 18x10' Mueller, q. c. 18x10' Hendey, q. c. 18x10' S. Boye & Emmes I. c. come drive, 16"x14' Sebastian l. c.,

No. 3 W. & M. Surface Grinder.
No. 33 Abrasive surface
Grinder.
No. 2 B,-S, surf, grinder.

between upr.
No. 56 Toledo, sgl. crk.
Ferracute double crank,
36" bet. uprights.
No. 65 Mich. s.s. sgl. ck. No. 160 Cons. str. sided double crank.

No. 05 Nia. circle shear. 72" Niagara foot power, 42" Pexto, foot su. 16 ga. 22" gap. 36" & 42" Power shear. 46"x16 ga. shear, 12" gap. MISCELLAN EOUS. 72" Niagara foot power, threading machine, No. 1 LeBlond Tool and

Cutter Grinder.
3" Acme Bolt Cutter.
No. 4 Mitts & M. Keys.
4" Landis, 6" Williams Pipe Cutter Hack Saws, Racine and Peerless. Shapers, 24", 20" and 16" various makes

Gridley auto., 14", 4-spdl. Rolls, 3-C Beloit 50"x 3/16" cap.

#### FOR SALE BY

#### The Reeve-Fritts Company 28 N. Clinton St., Chicago

Boring machine, No 1 Barrett, cylinder. Drill, 24 Fosdick radial, round column. Drill, No. 3 Barnes horizontal, double head. Drill, No. 3 Barues horizontal, double hea Gear hobber, No. 1 Adams Farwell. Grinder, P. & W. thread mill cutter, auto. Grinder, Gisholt universal. Saw, cold, Lea Simplex, 34". Screw driver, No. 2 Reynolds, auto. feed. Screw machine, 3"Cleveland automatic". Turret lathe, 13" P. & W., geared head.

#### The State Machinery Co., Inc. 865 Congress Ave., New Haven, Conn.

A Few. Like New Items, from our Stock, 

#### Rosenkranz, Weisbecker & Company, Inc. 2308 Singer Building, New York, N. Y.

2308 Singer Building, New York, N. Y. Boring mills, 60° Betts vertical, motor drive. Boring mill, 60° Betts vertical, motor drive, p. r. t. Gear cutter, 110° Newton, motor drive, p. r. t. Gerarder, Cincinnati 24°, face mill, motor drive. Keyseater, No. 20 Catin, m. d. Miller, 24° x24° x12° Ingersoll, adj. rali, m. d. Miller, 24° x24° x12° Ingersoll, adj. rali, m. d. Miller, P. & H. vertical openside. keyseat, m. d. Planer, 10° x7′ x18° Betts, 4 heads. PRST at, M. d. Planer, 10° x7′ x18° Betts, 4 heads. PRST at, Stotter, 18° Niles, vertical, m. d. Slotter, 18° Niles, vertical, m. d. Slotter, 24° Dill, motor drive.

#### Bradley Machinery Co. 529 E. Jefferson Ave., Detroit, Mich. A FEW ITEMS (PRICED) FROM OUR STOCK

Automatics, Brown & Sharpe. Bar shear, Doty (new)... Broach, No. 3 La Pointe. Cam cutter, Garvin. 

Turret lathe, Acme

Turret lathe, 2x24 O. & L. Hundreds of other items priced low. 3.1

M

#### FOR SALE BY

#### Standard Machinery Co., 347 Indiana Ave. Grand Rapids, Mich.

Boring mill, 14" Colburn vertical, Grinder, drill, Sellers 3" capacity. Grinder, No. 4 Badger disc, motor driven. Lathes, Porter-Cable Mig. (2). Miller, model C-1 Becker heavy vertical. Miller, Brown & Shaper, 78" x29" table. Planer, 36" x36" x10" American, m. d. Kolls, 8" x36" x10" American, m. d. Kolls, 8" x36" power for ming. Shaper, 25" Smith & Mills, m. d. Shear, No. 13 Pettingell 14 ga. Welder, 150 Toledo spot, 20 kw hand operated, Welder, 150 Toledo spot, 20 kw hand operated.

#### FOR SALE BY

#### B. D. Brooks Co., Inc. Boston, Mass. 119 Broad St.

Brake, leaf, Ohl. side-geared hand pr. 10'x10 ga. Ironworker & punch, Pels., comb., 24" thrt., 4xt angles. 4x\$ angles.

Rolls, forming, drop end, b. d., 8'x\$" cap .......

Rolls, corrug., b. d., 1\bar{2}" corrugations, 10'x18 ga. Shear, sq. No. 7132 Niagara overdriven, m. d., 11'x3/16. Shear, sq. No. D36 Pexto overdriven, b d. 1"gap, . 14 ga...

#### Marr-Galbreath Machinery Company

Marr-Galbreath Machinery Company
Air comp., 826" Gardner duplex m.d.
Bail or jar mill, 2-jars 19213", belt or m. d.
Blowers, (furnace) No. 2 Knight; No. 3 American.
Blowers, pressure, No. 11-PB Am. 18375 cfm., m. d.
Bolt cutter, 13" Landis, sgl. head.
Boring mill, horiz, 43" bar, N.B-P., m.d.
Boring mill, 36" Bullard rap, prod, m.d.
Boring mill, 36" Bullard rap, prod, m.d.
Boring mill, 36" Bullard rap, prod, m.d.
Boring mill, 36" Bullard vert, threading attach., b. d.
Boring mill, 34" Pond, 2-heis, Fctn. feed, c/s.
Brakes, hand, 4' Keene, 18 ga.
Brake, 6'x12 ga. Chicago, power, belted.
Brake, crimp and corrugating, 10'x16 ga. Keene.
Die filing machine, No. 2 Cochrane-Bly.
Die machine, 25 ton Henry & Wright, (near new)
Driller, horiz.. 6 spindle Nat'l Acme., No. 2 chucks.
Drill, 12" Champion, b. g., p. 1., m. d.
Drills, gang, 3 and 4 spindle, 1 to 4 MT.
Exhauster, No. 35 Baffalo, outlet 12x14", m. d.
Fan, ventilating, 24" American, m. d., 1/60.
Grinder, No. 2 Grand Rapida Tool.
Grinder, No. 12 Besley, double end disc.
Grinder, No. 12 Resley, double end disc.
Grinder, No. 12 Resley, double end disc.
Grinder, No. 2 Landis, plain, 10x30", c. s.
Grinding spindle, Excello No. 39, bracket 5002.
Hack saws, No. 2 & 4 Economy, belted.
Hammers, 500 lb. Eric, Arch frame, stam.
Hammers, 4000 lb. dble, frame, steam.
Hammer, 4000 lb. dble, frame, steam. Hammer, 3000 lb. Chbg., steam forging.

'Jammer, 4000 lb. Blise frame, steam.

Hammer, 4000 lb. Blise board drop (rebuilt).

Hammer, 1000 lb. Chbg, steam drop, double frame.

Hoists, fanton No I portable.

Hoists, Indon No I portable.

Hoists, Indon No I portable.

Keyseater, Morton, eap. 24"x24", s. p. d.

Lathe, No. 4 Rivett, bench, draw-in-att.

Lathe, 11'K' M' Artisan, q. c. g. s. p. d.

Lathe, 14"x6" Mulliner-Edlund. q. c. g. t. a.

"Lathe, 14"x6" Mulliner-Edlund. q. c. g. t. a.

"Lathe, 12"x8" Sebastain gap bed cone. Lathe, 14", 16" Mulliner Edlund, q. c. g., t. a. (Lathe, 15', 2"x8' Sebastian gap bed cone. Lathe, 17", 18" Le Blond, q. c. g., 3-step cone. Lathe, 17", 18" Le Blond, q. c. g., t. a. A. Lathe, 26", 110' Hendy, q. c. g., t. a. A. Lathe, 26", 110' Wolcott, q. c. g., d. b. g., 24" h. s., Lathe, 27", 110' Wolcott, q. c. g., d. b. g., 24" h. s., Lathe, 27", 110' Wolcott, q. c. g., d. b. g., 24" h. s., Lathe, 27", 110' Wolcott, q. c. g., d. y. d. c. Lathe, 18", 220' Springfield, m. d., 230 v. d. c. Lathe, turret, 2 Foster, cap, 34", s.p.d. Marking machine. No. 3 Noble & Westbrook. Miller, mfg. type, Kempsmith, table 44"x12". Motors, 15 h. p., West, 3'60' 220" 440' 870' rev. Motors, 15 h. p., West, 3'60' 220' 680' rev.

#### 57 Water St.,

### Pittsburgh, Pa

Motors, 30 & 40 h.p., West., CS. 3/69/220/870 rev. Nailing machine, No. 6 Morgan, 8-track, m. d. Nibbling machine, No. 1 Campbell, 6" thr. 3/16". Nibbling machine, No. 1 Campbell, 6" thr. 3/16". Nibbling mach Gray Dai Mc. Cap., 3/16" m.d. Fipe machine, 8 to 3" Jarcki, belted.
Pipe machine, 8 to 3" Jarcki, belted.
Pipe machine, 8" Jarcki, cone or m. d.
Pipe machine, 8" Wieland "Standard", m. d. Planer, 60" x85" x16" Gray, 3 hds. m.d.
Press, 7x8" x8" Niles, 1 hd., belt m. d.
Planer, 60" x85" x16" Gray, 3 hds. m.d.
Press, foot, Lewthwaite, wt. 400 lb., (4).
Press, foot, Lewthwaite, wt. 400 lb., (4).
Press, A. Bliss horning, stroke 4"
Press, A. Ferracute, 15" stroke, m.d.
Press, o. b. 1., bench, No. 100 B Perkins.
Press, o. b. 1., bench, No. 100 B Perkins.
Press, o. b. 1., bench, No. 100 B Perkins.
Press, agl. crank, 5% Toledo, str. 6"
Punch & Str., 36" Cleve, E. 1 kktl., A.J., dies, Punch, S. E., 36" Cleve, E. 1 kktl., A.J., dies, Punch, No. 50, 50 kbp., Saw, shaping, 6.86" Peerless, motor 3/80.
Shaper, 18" Blount, single geared.
Shaper, 20" American, cone or m. d.
Shaper, 20" G. & E., B. G. crank, cone.
Shaper, 20" G. & E., B. G. crank, cone.
Shaper, 21" Veerbeck, b. g. conk, gear box, s. p. d.
Shaper, 21" Veerbeck, b. g. conk, gear box, s. p. d.
Shaper, 21" Neerbeck, b. g. cond.
Shaper, 31" L. g. A. S. "gap, m.d.
Shear, Blocks & Blades 52" x4" cap, 1500 lb.
Shear, Blocks & Blades 52" x4" cap, 1500 lb.
Shear, Blocks & Blades 52" x4" cap, 1500 lb.
Shear, Blocks & Blades 52" x4" cap, 1500 lb.
Shear, Blocks & Blades 52" x4" cap, 1500 lb.
Shear, Blocks & Blades 52" x4" cap, 1500 lb.
Shear, Blocks & Stanley Unishear, cap, 14 ga., m. d.
Straightening roils, Cleveland 60" x4" x1" m. d.
Tapping machine, 4" Pratt & Whitney, b. d.
Tapping machine, 4" Pratt & Whitney, b. d.
Teating machine, 500 lb. Economy hand power,
Transmission, Reeves No. 06. E. (new)
Turbines, 100 h. p. Westinghouse, 900 rev.
Turret larke, 18" x6" Springfield, Fox Monitor,
Turret-screw machine, 1"x15" P. & W.
Upsetter, 14" Acme, all steel,
Welder, arc, 160 amps, a. c., (near new) (2),
Welder, arc, 280 amp, a. c., (near new) blade, cap. 21" sq., m. d.

#### FOR SALE BY

## The Elyria Belting & Machinery Co.

A BARGAIN ONCE IN A LIFETIME Unbreakable New Machinists' Vises, Made entirely of drop-forged steel. Only a limited number left.

3" stationary \$4.50. 4‡" stationary \$5.75. 5" stationary \$7.50. 3" swivel \$5.50. 48" swivel \$7.75.

Write for circular.

#### Alex Zeeve 2280 Woolworth Bldg., New York, N. Y.

Bandsaw, metal-cutting, No. 8 Marvel, a. c., m d. Drill, radial, 4' Dreses, gear-box, m. d., box table. Keyseaters, No. 2 Mitts & Merrill, antomatic fid. (2). Lathes, engine, 53'x34' Nicholson-Waterman, geared faceplate, taper; 24'x16' Whitcomb-Blaisdell q. c., taper, 15'—24'x8' Sebastian gap, q. c., g. h., a. c.

#### FOR SALE BY

#### C. C. Howarth Machinery Company 1440-1444 Franklin St., Detroit, Mich.

DESIRABLE MACHINES ON OUR FLOOR Lathe, 14x6 Hendey. Lathe, 20x10 Monarch, cone drive. Lathe, 20x10 Monarch, cone drive, Miller, No. 3 Van Norman, m. d. Miller, No. 20 Van Norman, m. d. Shaper, 4º G. & E. m. d. Shaper, 1º "American, m. d. Shaper, 1º "American, m. d. Slotter, Garvin 4" stroke.—And many others.

Send us your inquiries.

#### E. L. Klauber Machinery Co. 3221 Olive St. St. Louis, Mo.

Lathes, 16"—18"x8' Lodge & Shipley; Lehman, Millers, No. 1 and No. 14 Knight vertical, Millers, No. 0, 3 Burke; U.S. hand; No. OY, B & S Press. No. 69N Bliss o.b.i. double acting. Presses, No. 3 R & K. o.b.i.; No. 1 Standard o.b.i. Turret Lathee; hand acreew machines. Large assortment

West Penn Machinery Company Air compressors, 30 to 2500 cubic feet.
Air compr. portable gas I-R 180 cu.ft.
Air compr. portable gas I-R 180 cu.ft.
Bluing press, 22-P, Locgman, m. d.
Blower, No. 4 Roots, Capacity 2110c. f. m.
Bolt cutter, I'L andis, double head, b. d.
Bolt cutters, 14" & 3" Acme, b. d.
Bolt threaders, automatic, Landis 4", m. d.
Boring mill, 10" Niles, 2 heads, b. d.
Boring mill, 10" Niles, 2 heads, b. d.
Boring mill, 10" Niles, 2 heads, b. d.
Boring mill, 72" Niles, 2 heads, b. d.
Boring mill, 72" Niles, 2 heads, b. d.
Boring mill, 72" Niles, 2 heads, b. d.
Boring mill, 74" Niles, 2 heads, b. d.
Boring mill, 74" Niles, 2 heads, b. d.
Boring mill, 10" Niles, 2 heads, b. d.
Boring mill, 10" Niles, 2 heads, b. d.
Boring mill, 10" Niles, 2 heads, b. d.
Brake, 10"-14 ga., D. & K., hand.
Crusher, Jaw, No. 4 Chiampion, b. d.
Draw bench, 30,000 lbs. W. F., 22" draw., m. d.
Die sinker, No. 2 Pratt & Whitney, b. d.
28" x16" Chard d. b. g., 1. a., b. d.
Drill, radial, 8 Reed-Prentice, single pulley drive.
Drill, 10" 310 Eaker, Ad., s. p. d.
Drill, appright 10" to 3"

Engine, gas, 20 horse power Bessemer.
Engine, gas, 20 horse power Bessemer. Air compressors, 30 to 2500 cubic feet 

Pittsburgh, Γa. 1210 House Building,

O riouse Building, Pittsburgh, I's Press, forging, 150 ton United, steam hyd.
Press, hydraulic 160-ton Southwark.
Press, hydraulic 160-ton Southwark.
Press, Coll. No. 19 Bins & No. 4 Niagara, 2" str
Press, No. 55 Toledo, bed 20x19.
Press, arew. No. 37 Niagara, hand power.
Press, spindle, Waterbury-Farrell,
Press, arch, No. 30 Bins, roll feed, b.d.
Pumps, centrifugal 6", 4", 1" motor drive.
Punch, comb., No. 12 Bins, roll feed, b.d.
Punch, etc., No. 30 Bins, roll feed, b.d.
Punch, the Cleveland, 36" throat, 18" thru 1".
Punch, horiz, No. 7 Kling, m. d., 239/3/60.
Riveters, air, hammer, spinning.
Rolling mill, cold 9"x18" motor drive.
Saws, friction, Nos. 2, 28 & Ryerson motor drive. 

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#### GRINDERS-

No. 14 Pratt & Whitney vertical surface, ball bearing, magnetic

No. 24 Gardner, horizontal, 53" disc. motor and starter.

No. 12 Natco 20 Spindle, rectangular head.

#### SCREW MACHINES-

No. 5 Foster, geared head, complete. Nos. 4's: Millholland; Briggs. B& O. all complete.

#### HORNING PRESS-

No. 43P Toledo 4" stroke, with swinging table.

#### MILLING MACHINES-

Nos. I and 2's, plains and universals, complete equipment,

#### POWER SHEAR-

Ohl, 48", 12 ga, capacity, SCREW PRESS-Stecher.

GILMORE MACHINERY

28-30 S. Clinton St. Chicago, III.

#### SPECIAL FOR OUICK SALE

Boring Mill. Rogers, 30" vertical, swing approx. 36" pulley drive.

#### PLANERS

36x36x20 ft. bed, Gray, 2 heads on rail; pulley drive.

26x26x6 ft. Hamilton, 1 head on cross rail, pulley drive.

Radial Drill, 4 ft. Muller M.D. with tapp. Lathe, Bridgeport, 28"x12 ft., heavy of duty.

quick change.

Lathe, 48" Gap, Harrington.

centers, with raising ble 15 ft. between

Lathe. 48" Gap. Harrington. 10 II. between centers, with raising blocks.

Drill Press. 4-spindle Barnes.
Mill. Puplex. No. 3½ PaNW, cone drive.
Milling Mach., No. 1-½ Chreinnati, with bracket for motor drive.
Mill., No. 4. Cincinnati, cone-head
Wire Straighteners, Wells, cap ½-3/16", 3 ft.
cut-offs, 4", 3 ft. cut-off, Nielsen 3"
52" cut-offs, (cut-offs can be extended to

**GLOBE MACHINERY COMPANY** 602 W. Lake St. Chicago, Ill.

#### FOR SALE BY

Factory & Mill Supply Co., Inc. 176 Federal St., Boston, Mass.

#### MOSER'S HIGH GRADE TOOLS

No. 2-G Brown & Sharpe Automatic

No. OG Brown & Sharpe Automatic, slot. att. Cleveland Automatic, 3-34". Model A. serial 28000

Gridley Automatic, 1-3/4" 4-Spindle

Norton Hydraulic Surface Grinder, 6"x10"x36", chuck, comp. with motors

Universal Grinder, No. 21/2 Bath

Oliver Cutter Grinder, 24" cap, milling cutters, complete with motor

No. 1 Gardner Dbl. End Grinder, M.D.

Wire Straightener, F. B. Shuster, %" cap.

Screw Machine, No. 4 B.&O., A.C., B.F., P.F. Screw Machine, No. 0 Foster, A.C., B.F., coll. Die Slotter, 2" Garvin.

Punch Press, No. 41/2 R. & K.

Barnes Drill, 20" 4-spdl., A.G., P.F.

Broach, No. 3 LaPointe, M.D. 8"x84" Fitchburg Lo Swing Lathe

1608-10 W. CLYBOURN ST. MILWAUKEE, WISCONSIN CLYBOURN ST., MOSER MACHINE TOOL SALES.

### NEW 3 Phase B. B. Motors 1/2 to 25 H. P., 5 H. P. \$55.75

DRILLS 20° Lever, Wheel & Lever and Power Feed. 24° and 28° sliding head, back gear, power feed. Bausch Multiple 16 spindle No. 1 Morse Taper.

4 spindle Foote-Burt, heavy duty.
6 spindle Hole Hog No. 1 Morse Taper, power fd.
1, 2 and 4 spindle high speed 8\* overhang.
5\* Bausch Radia | Drill.

59 other drills of various sizes and types.
MISCELLANEOUS

Brake, Robinson, toggle, 5'. Brakes, 6' and 10' for 18 gauge

Grinders, cutter and cylindrical, plain and univ.

Grinders, Bryant deep hole chucking. Broaching machine, No. 1 LaPointe, 24°x 12' South Bend Lathe, with raising blocks. 24\*x 12' South Bend Lathe, with raising blocks, 31 other lathes 10<sup>8</sup> to 24<sup>8</sup> awing, 5' to 14' beds. Milling Machines, Nos. 1½, 3 and 4 plain, Milling Machine, 20'\*x20'\*x26' Ingersol Islab, m. d. Milling Machine, No. 1 Bilton, automatic gear. National Acme Automatics Nos. 52. 53 and 55. Shapers, 16\*, 18\*, 20\* and 24\* Gisholt, m. d. Turret Lathes, 21\* and 24\* Gisholt, m. d. Planer, 36\*x36\*x14\* Gray Standard Pattern. Press, No. 24\* Toledo double acting cam drawing. MOTORS, REBUILT 3 Phase ½ to 50 HP variess speeds.

This is only a partial list of our large stock, which is constantly changing. Write for what you need THE OSBORNE & SEXTON MCHY. CO., Dept. H. COLUMBUS, OHIO

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#### D. E. Dony Machinery Co. 47 Laurelton Rd., Rochester, N. Y.

Boring mill. 52" King, motor drive, Drill grinder, Oliver 14" capacity. Furnace, American No. 2-B rotary. Gear hobber, No. 12 Barber-Colman, Hand mills, No. 1 Kent-Owens, m. d.

### C. R. Daniels 1514 W. Capitol Drive, Milwaukee, Wis.

Boring mill, 96" Niles, vertical, cone drive. Broach, La Pointe No. 3 Keysester, No. 2 Mitts & Merrill, complete. Punch press, No. 2 Toledo O B.I., flywheel type. Toggie press, 400 ton Bliss, No. 358 double.

#### BROWN & SHARPE AUTOMATICS

3-No. 2 high speed, serial numbers ranging from 7000 to 7500, all standard equipment.

3-No. 2 high speed, serial numbers ranging from 6100 to 6300, all standard equipment.

2-No. 2 standard speed, serial numbers 4741 and 4124, all standard equipment.

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#### LAKE MACHINERY CO. CHICAGO, ILL.

652 W. LAKE ST.

#### FOR SALE BY

#### S. M. Regar Machinery

Tampa,		-		Florida
Boring mills		vertical		
42" Bullard,		2 swi	vel heads	#1000
36" Niles		2 swi	vel heads	800
30" Niles		l swi	vel head	500
30" Bullard		1 swi	vel head	500
Boring mills		horizont	tal	
Table type I	Bickfo	ord, 4" s	pindle	900
Table type h	linser	3# s	pindle	500
Table type I	10.1	Barnes Ra	dial Dril	300

#### FOR SALE -GOOD TOOLS

Automatic, B. & S., No. 00, Ser. 6805 \$750. Automatic, Gridley % Model "F", 4 spindle Automatic, Gridley ¾ Model F , 4 spindle seriai 7439. \$350. Automatics, Gridley, 1¾, model F , 4-spin-42° Colburn Boring Mill, Rapid Power Traverse BANSBACH MACHINERY CORP. 3845 West Madison Street.

LATHES

60"x18' Niles, b.d., 12' centers 54"x16' Johnson, m.d., triple grd. 22/46x8' Put. gap. slid. bd., Q.C. belt 18"x10' Greaves Klusman, belt dr. 16"x8' Walcott, belt dr. Q.C. DRILLS

4' Fosdick plain radial, s.p.d.

20 spdl. Natco, mtr. dr. hd. 14"x27" 10 spdl. Natco, 131/2" dia. head, No. 1 taper MD.

MILLING MACHINES No. 4 Pratt & Whitney Vertical Die Sink. & Mill. Mch., table 18"x72" No. 3 B&S Pl. tbl. 51"x141/2", mtrzd. No. 11/2 Am. Pl., range25"x9"x19",blt. MISCELLANEOUS

42" Bullard Vertical Boring Mill, Q.C. feeds, 2 heads 1000 to 2000 lb. Board Drop Hammers, B&S and Chbsg. ALSO BOILERS-PUMPS-WELDERS and OTHER POWER PLANT EQUIPMENT IN STOCK.

THE O'BRIEN MACHINERY CO., 113 N. Third St., PHILADELPHIA, PA.



# CONSIDER GOOD USED EQUIPMENT

### IMMEDIATE AVAILABILITY AND DELIVER

Ingers.-R.

Driven Canacity 11" Plate
10" King, MD Capacity 1"
20" Niles, MD Capacity 4"
20" Niles, M D., Capacity 4"
80RING MILL—HORIZONTAL
7" bar Detrick & H. Planer
Type, M.D. Pwr. Fd. in All D.
80RING MILLS—VERTICAL
52" King, M.D. Equipped with
Two Plain Rail B.

2" King, M.D. Equipped with Two Plain Rail Heads, Power Rapid Traverse in all directions 2" Gisholt, M.D. Ten Feed Rapid Traverse 1.72 Gisholt, M.D. Ten 1.72 Gisholt, M.D. Ten 1.81 Directions 20 Fond, M.D. Two Pl. S. Heats Q. C. Gear Feeds BRAKE—LEAF TYPE (\*\*D.&K. "Chicago" No. Motor Driven, Capacity 2 \*\*DESS TYPE

6" D.&K. "Chicago" No. 167
Motor Driven, Capacity 2"
BRAKES—PRESS TYPE
N6" Loy & Naw., M. Dr. Cap.
No. 10 Ga.
10" Loy & Nawrath Model No.
610, M.D. Cap. 2" over 3"Die

BULLDOZERS head 12"x76" Strok o. 7 Williams & Wi Face of Crosshead Stroke 22" Stroke 10 & White, M.I. 16"x70".

CRANES OVERHEAD ELEC-

5 ton Bedford 35' 6" Span, 220/3/60 AC 60 ton North, 49' 8p. 220VDC 0 ton American 59'10" Span, 0 ton American 59'10" Span, 0 ton Chemical Span, 10 ton

10 ton Champion 85'11" Span, 440/3/60 AC 20 ton Morgan 50' Span, 220 Volt DC 5 ton Auxiliary

Volt DC 5 ton Auxiliary
20 ton Morgan 50' Span,
Volt DC 10 ton Auxiliary
20 ton Morgan 62' Span,
Volt DC 10 ton Auxiliary
GRANE—GANTRY
4 ton Link Belt, 100' Span
/3/60 A.C. With 2 Yd.
liams Clam Bucket
DIEING

hams Clam Bucket
DIEING MACHINE
25 ton Henry & Wright
FLANGING MACHINE
1" McCabe Pneumatic Flanging

FORGING MACHINES jax, Nat. Acme, St. Fr. FURNACES

FURNAUM
9000 Ib Swindell Electrowith
ing Furnace Complete with
1800 KVA 22,000/3/60 Trans.
10 ton No. 5 Heroult Slag Melting Furnace Complete with
7560 KVA 11,000/3/60
Teansformers (New)
Liec. Steel ing Furnace Complete with 7500 KVA 11.000/3/60 Transformers (New) ton Pittsburgh Elec. Steel Melt. Furn. Comp. with Trans.

6000 Ib. CHAMBERSBURG STEAM FORGING HAMMER Double Frame— Type -Guided Ram

> Ib. 6500 ERIE BOARD

HAMMERS ERS—BOARD DROP— DROP-STEAM FORG.

1000 lb. to 8000 lb Chamb., B. & Sp. Erie, N-B-P Morgan JOGGLING MACHINE No. 2 Morgan Plate, M.D. Cap. to joggle 4" Plate 42" f. edge ATHE

ew Haven Lathe, M.D. 21' Be-tween Centers 72" Swing, with 10" Raising Block

twen Centers 72" Swing, with 10" Raising Block ATHES—AXLE 11"x13'6" Putnam Hvy. Duty, M.D. 102" Distance bet. Cent. Co. 3. N-B-P Dbl. Axle Lathe, Hvy. Duty, M.D. 111" Distance Between Centers

tance Between Centers

LATHE—ROLL

44" Hyde Park Dble. Roll Lathe.
M.D. 33" Bed, head stock at each end, 22" betw. centers.

PLANERS PLANERS
48"x18"x16' Cinc. 2HD. MD,
72"x60"x31' Pond 2-Head, R.D.
100"x84"x25' Pd 4-Hd, B.M.D.
PLATE DUPLICATORS.
Thomas Plate Duplicator, Table
& Funch, M.D. Cap. Punch
thru 1", 73" Wide x 20"

Long

Thomas Plate Duplicator, Table & Punch, M.D. Cap. Punch 11" thru 1", 73" Wide x 13" Table

PRESSES-HYDRAULIC #E\$\$E\$—HYDRAULIG 00 th Chambersh Self-Cont. 4 Col. Hydro-Pueu. P. 12" Dia. of Ram, 18" 8tr. 49" Bet. 000 ton Wood Four Col. Forg. Press, 36" Dia. of Ram, 24" 8tr., 22"x41" Retw. Columns 3000

PRESS—STRAIGHT SIDE
No. 96F Toledo Double Crank,
12" Str. 124" Bet. Uprights
PUNCH—BEAM

PUNG Beam Funch & Cop. Mch.,
Kling Beam Funch & Cop. Mch.,
Kling For M. D. Cap., to cope or
notch 69 to 24" Foleams, Eqp.,
to punch 6 1" holes in 1"
plate; shr. 8" clan or I-beams
PUNCH—MULTIPLE
HILLES & J. No. 7, 98" Betw.,
Hous., 18" Thr., M.D., Cap. to
the company of the company of the company
1" plate. Equipment Thomas
1" plate. Equipment Thomas
2" Table 22"6" long
COMBINA-

PUNCH & SHEAR COMBINA-TIONS

o. 6 Beatty Dble. End, M.D. 16" Thr. Cap.Punch1" thru1" No.

IMPORTANT FACTORS

No. 14 Wil. & W. Sgle. End, M. D. Lysholm Table Cap. Punch 14"x1" Throat 48"
Hil. & J. Punch, Sgl. End, M.D. Thr. 60" Cap. Punch 2" thru 15" William Table Type Clev. Sgle. End, M.D. Thr. 60" Cap. Punch 2" thru 15" William Table Type Clev. Sgle. End, Arg. Thrusholm Double End, M.D. 44" Thris. Cap. 1-4" thru 4" Steel ROLL-PLATE STRAIGHTEN. 96" Newbold, Arr. for M.D. Nine 14" Dia. Rolls. Capacity 1-1" Plate ROLLING MILL. 4" Plate ROLLING MILL. 6" Selam Rar Mill. Consisting Capacity 1-1" Plate ROLLING MILL. 6" Selam Rar Mill. Consisting Stands 3 high 9"x30" Stands 3 high 9"x30" Stands 2 high 9"x 13", 3 stands 3 high 9"x30" High 10-4"x12" UE&F Sgl. Std. 2 Hi. 16"x20" Nat. F. Sgl. Std. 2 Hi. Sheet Bar and Skelp Mill with 3 Stands of Vertical Rolls 2" Mackintosh Merch. Bar Mill.

plete instan.

" Morgan 8 Stane
Sheet Bar and Skelp Mill
3 Stands of Vertical Rolls
4" Mackintosh Merch. Bar
One 3 High Stands.

One Stand

One 3 High Stands. One 2 High Bull Head Stand 30" Morgan 3 High Bill. Mill 44" Bloom. Mill. Consist Pin-ion Stand, Rol. Tbl. & CatchT.

Wellman Seaver Hot Saw, for M.D. T2" Dia, Saw, pacity 11!" Sq. Billets

\*\*SHEARS—ANGLE\*\*

\*\*Y.478." L. & A. Dbl A. Shear Arr. motor drive

\*\*G\*\*G\*\*G\*\*J\*\* Hilles & J. No. Dbl. Angle Shear, Arr. Motor Driven

\*\*S\*\*S\*\*J\*\* L. & A. Size C. I. Angle Shear, Motor Driven

\*\*SAR\*\* Motor Driven Dbl Angle C Dbl.

o, 3 Hilles & Jones Guill. Type, Arr. for M.D. Cap. Shear 3" Round, 2-4" Square, 10"x14" Flats 6"x6"x½" Angles

Rounds, \*\*\* Rangers Angles Flats, \*\*Rangers Angles 74" IF&F Co Bar Shear, Angles Growth Community eight 8'\*: 1-1" Bars, Complete with 7 Bar Shear Approach Table Mesta Vertical Open Throat B Shear, \*\*MD, 1-1" x80" Cy to cut four 1-1" x8" Cold Statel Sheat Bars, Complete With Tables Bar Can. Cold Soft

Complete SHEARS—GATE 132" Morgan. 71" pacity 1-1" Plate 1" Stroke. Ca-

32" Morgan. 75" Stroke, Capacity 1-1" Plate
fo. 6 Hilles & Jones, Arr. M. D.
Cap. 96"x 5" Plate
fo. 6 Hilles & Jones, Arr. M.

Entire Surplus Manufacturing Equipment Inventories Purchased. Appraisals. Liquidations. Consulting Engineering Service. Bona Fide Auctions arranged.

EQUIPMENT AVAILABLE for practically any type of manufacturing requirement

# PANY, INC. PH. CORTLAND 7-3437-3438

PARK BUILDING
CABLE ADDRESS: RITTERBUSH, NEW YORK

**ANTIC 1208** 

- 5' Niles Full Universal Radial Drill-can be used for Horizontal Boring-Plain Base A. C. (6 H. P.) Motor
- 4' Bickford Plain Radial Gear Box Plain Base, Low Price 8' x 10 gage D & K all steel Folding Brake, 8" fingers
- No. 1 Diamond Surface Grinder-Mag. chuck
- x 30' Niles 42" x 18' Prentice and 40" x 20' Lodge & Davis Lathes
  - 4" Catlin Keyseater-Large Assortment Equipment
- 24" x 48" x 10' Rahn-Larmon Sliding Bed Gap Lathe-L change
- —motor, (A.C.) Drive fine condition 150 and 400 ton Hydraulic Wheel Presses
- 3 H. LeBlond No. 2 Rockford Plain Milling Machines with Div. Head
- Punch Presses, Turret Lathes, Gear Cutters, 6" Pipe Machine - A. C. Motor Drive
- Nearly new 22" x 7' Cincinnati Planer 38" Gang Slitter with 25 H. S. Cutters

#### LARGE STOCK OF OTHER MACHINE TOOLS AND SHEET METAL MACHINERY

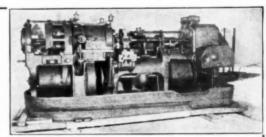
### THE NORTON-BROADWAY MACHINERY CO.

610 Baymiller Street.

CINCINNATI, OHIO

### GOOD MACHINES

- 3" Model "B" National Automatic, spindle.
- 3]" Model "B" Na-tional Acme Automatic, 4-spindle.
- G-No. 6-A Potter & Johnson Automatic Turret Lathes.



### MISCELLANEOUS:

- No. 000 Brown & Sharpe Automatics
  -Mod. "B" Tur. Type Norton Grind.4"15"
  -No. 132 Arter Auto. Cylindrical Grinders
  -12"38" Landis Plain Gylindrical Grinder
  -No. 4 Milholland Turret Lathes
  -30"30"118" Gray Planer, 2 heads
  -No. 13-C Natoc Hydraulic Multiple Drill
  -No. 14 Natoc Multiple Drill
  -No. 12 Brown & Sharpe Plain Grinders
  -No. 221 General Flex. Hyd. Press—20
- ton
- No. 3 Cincinnati Pl. Millers, Slotted S.N. No. 6 Gardner M. D. Disc Grinder, 26"
- 1-No. 20 Bryant Hole Grinder
- 1-No. 24 Gardner Horizontal Disc Grinder, 53" disc
- 1-Hutto 2-spindle Internal Honing Machine
- 1-No. 1B Cleveland S.E.Punch-36" throat 1-11" Acme Upsetting & Heading Machine
- -steel head M.D. 8"x8"x1" Kling Double Angle Shear M.
- D., on turntable 1-11' x 16 Qa. Stoll Square Shear
- 3-Crankshaft Lathes-Wickes 50-Drills of all sizes

These are but a few of the many items we have in stock.

RIVERSIDE MACHINERY DEPOT. 255 St. Aubin Ave., Detroit, Mich.

#### BORING MILLS. Horizontal

5-3" bar D. & H. Floor. 4-2" bar Niles Knee Type. 4" bar D. & H. Floor Type 6" bar Barrett Cyl. Borer 4" bar Glisholt, knee, M.D. 8" bar Beaman Smith, Floor & H. Floor, es Kuce Type, H. Floor Type,

#### BORING MILLS, Vertical

10' Pond Heavy Duty.
10'-16' Niles Ext. Type M.D.
24" Bullard Rapid Pro.
72" N. B. Pl. P.R.T. M.D.
72" Colburn, P.R.T. New.
60" Betts, M.D.
48" Gisholt, P.R.T. M.D.
44" Bullard, Maxi-Mill P.R.T.
42" Bullard, Maxi-Mill P.R.T.
36" Bullard Rapid Pro.
36" Colburn, 1 Turret Head.

#### DRILLS. Radial

6' Mueller, Gear box, M.D.
6', 4' & 3' Cine. Bickfords
21'', 24'' 26'' Cine. Bick.
21'', 24'' 26'' Cine. Bick.
3' American, Sensitive.
3' American, Sensitive.
5' - 6' Anner, Tri. Fur. Moon-arm.
5' - 6' Anner, Tri. Grd.
2 spindle Alien M.D.
4 Spindle No. 2B Edlund.
4 Spindle Kokomo, No. 3 M.T.
24 spindle Bausch No. 2 M.T.
No. 22 | Foote Burt.
26'' Barnes Camel Back (5).

#### GRINDERS

8"x54" Fitchburg Pl., m.d. 10"x18" Norton Hyd. Feed. 10"x52" Landis Plain. 16"x50" Norton Self Cont. No. 6 Brant Chucking. 12"x48" Diamond Surf. No. 3 16"x80" No. 18" Beely No. 26 Disc. 18" Beely No. 26 Disc. 20"y56" Landis. No. 11 Landis Teel A. (Inter. No. 11 Landis Teel A. No. 11 Landis Tool & Cutter. No. 22 Heald 12" Rotary. No. 55, 60 and 65 Heald Cvl. New Yankee Twist Drill Heim, Centerless.

#### LATHES

14"x6' Cisco t.a., draw-in. 14"x6" Claco I.A., Graw-in.
14"x6" Monarch, q.c.g., cone.
16"x8" Prentice, Grd. Hd.
16"x10" Mona'h I.C.G. Cone.
17/19"x10" Sidney Q.C.G.
18"x8" Amer. Grd. Hd. (2)
18"x8" Walcott Q.C.G. Cone.
18"x8" Barnes L.C.G. Cone.
18"x8" Lodge & S. Cone. cone.

#### LATHES (Continued)

19"x8' LeBlond, Cone. 20"x12' Greaves K., T.A. 20"x12' New Haven, T.A. 24"x10' American Cone CG., Cone 24"x19" 24"x14" Schumacher Boye Q. 24"x19' American L. C. G. 24"x14' L & S T.A., Cone 25"x12' LeBlond, Q. C. 25"x12" LeBlond, Q. C. G. Cone, T.A. 26"x10" Pond, Q.C.G., Cone 28"/50"x10" Ran-Larmon Gap 30"x13" N.B.P. Grd. Hd., M.D. 30"x16" N.B.P. Axel & Journal, Center Drive, M.D. 20"x14" Putnam Axel, Center Drive, M.D. Drive, M.D. 30"x25" Pond L.C.G. Cone. 32"x17' Fifield, triple grd. 36"x14' Pond, Grd, Hd., M. 36"x15' Putners 36"x14' Pond, Grd, Hd., M.D. 36"x15' Putnam Grd, Hd., M.D. 36"x21' Bridgeford, M.D. 36"x22' Bridgeford, M.D. 42"x20' L. & S. Cone, Q.C.G. 42"x30' Johnson Grd, Hd. M.D. 42"x30' N.B.P. Grd, Hd. 90" N.B.P. Heavy, Wheel

#### MILLERS

No. 2 Hendey Univ. Cone, MD.
No. 6 Becker Vertical.
Model C Becker Vertical.
Model CS Recker Continuous.
No. 6 Jackson Die Sinkers (3)
No. 4 Cincl. Univ., Cone
No. 3 Kenpsmith Pl. Cone
M.D.
No. 3 Kenpsmith Pl. Cone
M.D.
No. 3 Midwatker Pl. S.P.D.
No. 3 Midwatker Pl. S.P.D.
No. 1 Midwatker Pl. S.P.D.
No. 2 Midwatker Pl. S.P.D.
No. 1 Midwatker Pl. S.P.D.
No. 2 Midwatker Pl. S.P.D.
No. 2 Midwatker Pl. S.P.D.
No. 3 Midwatker P rtand.
Duplex 24" &
rand Rigidmills (2)
4"x12' Ingersoll Adj
Planer Type M.D 18" Cinci. Duplex Sundstrand Rigidn 36" 240724 Adj. Cinci. Semi. Auto.

#### **PLANERS**

48"x48"x12' D&H Openside. 48" x 48 x 10' Gray. 2 Hds., 48"x36"x10' Gray. 2 Hds. 36"x36"x20' Chandler 4 Hd. 36" Newton Rotary, M.D. Hds., 36" Newton Rotary, M.D. 30"x30"x10' D. & H. Openside. 30"x30"x8" Powell 2 hds. 27"x27"x6' W. & P. 1 Hd. 24"x8' Gray; 24"x7' Niles. Lynd Farguhar Openside.

### TURRET LATHES

No. 1 Cincinnati Acme Semi-Univ. Timk. Bear., M-in-B. No. 4 W. & S. Cone, M.D. No. 5 Foster, 1-13/16" bar. No. 6 Foster, 2-12" bar.

#### TURRET LATHES (Continued)

Nos. 9 & 2 Bardons & Oliver 24" Gish. 64 H.S., 2 Cone 28" Gisholt M.D. 214"x24" & 3"x36" J. & L.

#### MISCELLANEOUS

Automatic, 24" Gridley, 1 Sp. Billet Breaking Mach., Ajax. Bolt Threader, 11" Land Rolt Threader, 2" Landis. Landia Bolt Threader, 2" Landis. Broach, No. 2 Lapointe Belt. Chucking, Nos. 34 & 23 N B. Die Sinkers, No. 6 Jackson (3). Flanger, 4" McCabe Pneu. Gear Cutter, 110" Newton Spur Gear Cutter, No. 13 B. & S. Gear Generator, No. 1 Lees-Bradner.

Bradner.
Gear Gen. 11" Gleason Bevel
Gear Planer, 24" Gieason.
Gear Hobber, 6" Pfauter.
Hammer, No. 2B Nazel, M.D.
Header, 14" Acme Rivet.
Header, 2" Acme, Steel. Header, Z. Acine, Steet. Keystra, No. 1 Bak., No. 1 Dav. Keyseat., Nos. 2, 3 & 4 M&M Nibbler, 36" Gray, #", No. 3. Pips Mach., 4" Landis, M.D. Pipe Mach., 8"x12" Williams Pipe Mach. 4" Landis, M.D.
Pipe Mach., 8"x12" Williams
Pipe Machine, 12" Saunders.
Pipe Mach., 12" Curtis & C.
Pipe Mach., 2" Bignall Keeler. Pipe Mach., 2" Bignall Keeler. Prens, No.8 & Z & H Percussion Press, Foreing 50 ton Lucas Press, No. 61 Spec. V & 0. Presses, No. 18 Bliss B. & FI Punch & Shear No. 47 19Hc H. Punch & 54" H & J No. 2 D. E. Punch, 36" Whit. 3"x\u00e1". Rolls, 8'x\u00e1" H&J No. 2. Rolls, 8'z' H&J No. 2. Saw, No. 3 Ryerson Frict, D.C. Saw, 9"x9" Peer, Hack, M/D. Saw, 6" Avey Milband.
Saw, 6" Peerleas, Hack M.D.
Saw, 6" Gorton No. 2B Inter.
Saw, 6" Napier Band
Saw, 6" Peerless Univ. M.D. Shaper, 24" Gould & Eberhardt Shapers, 24" & 20" Queen

City M.D. Shaving Mach. P. & W. Vert. Alligator Shear, Carlin 1-3"Sq. Shear, 8'x1" H.&J. No. 2 12"

Shear, 30" Cleveland, No. X. ear, 156"xi" United, 36" g. 126"xi" Amer., 22" Gap. Shear, Slotter 15"-18" Dill. Slotter, 24" Dill A.C., M.D.

## BENNETT-RAFKIN MACHINE TOOL CO., Inc.

Offices: 30 CHURCH ST., NEW YORK CITY

### HIGH GRADE MACHINE TOOLS FOR IMMEDIATE DELIVERY

MILLING MACHINES:

IILLING MACHINES:

No. 1B and No. 2B Brown & Sharpe,m.d.

No. 2 Van Norman, m.d.

No. 1 Hendey B.G. Universal with dividing & vertical heads.

No. 1 Rockford, b.g.

No. 0 Brown & Sharpe hand.

No. 10 Pratt & Whitney hand.

RADIAL DRILLS:

Cincinnati Bickford. 5' Mueller.

5' Hammond sensitive, b.b. Drill. SCREW MACHINES:

No. 3A Warner & Swasey. 2—No. 6 Warner & Swasey. 2—No. 4 Warner & Swasey.

2—No. 4 Warner & Swasey.
No. 2 Brown & Sharpe Semi-Automatic.
1" Pratt & Whitney power feed to turret.
1" Milholland hand.
%" capacity Pratt & Whitney.

BORING MILLS:

Rogers, m.d., push button control.

36" Bridgeport.

ATHES:
124' Monarch, q.c.g.
14x6' Monarch, d. b. g., q.c.
16x8' South Bend, m.d., q.c.
16x8' LeBlond q.c., taper att.
Sidney 18x8', d.b.g., q.c.
22x10' Davenport hvy. duty, d.b.g., q.c.

SHAPERS:

14" Steptoe. 16" Hendey 16-20-24" G. & E. 24" Gould & Eberhardt, power fd. to hd.

No. 2 Brown & Sharpe, m.d., surface. Reed with magnetic chuck.
No. 1 LeBlond universal cutter, reamer grinder. 18" Besly disc Grinder.

10' 16 gauge Geo. A. Ohl m.d. Shear. 10' 1/4" Capacity Geo. A. Ohl m.d. Shear

CO.

This is a partial list. Write or wire us your requirements. We will pay cash for surplus Equipment. Let us know what you have.

& S. MACHINERY 207 CENTRE STREET.

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CAMBRIDGE, MASS.

# IGGLESWORTH MACHINE

199 BENT STREET,

Cable Wigmachine

PLANERS

30"x30"x10" Whitcomb Second-Belt. 38"x38"x9" Flather, 2 heads. 42"x42"x10" Detrick & Harvey O.S. 48"x48"x32" Detrick & Harvey O.S.

# No. 3 Avey Ball Bearing Upright. 26" Barnes Sliding Head. No. 17—4 spalle. Foote Burte. No. 11 Pratt & Whitney Multiple. No. 12 Pratt & Whitney Multiple. 3\\\^2\end{align\*} Western Rachial, M.D. 4' American Triple Purpose. 6' American Radial, S.P.D. LATHES

DRILLS

15"x7' Seneca Falls Tool Room.
16"x8' Hendey, q.c.g.
18"x9' Chard, Semi-quick-change.
18"x12' New Harven, l.c.g.
20"x10' Hendey, q.c.g.
22"x20' Flather, l.c.g.
24"x12' American, Gd. Hd.
42"x30' American Gd. Hd. Taper.
32—64"x11' Fay & Scott Gap. Q.C.G.
48" Putnam Standard Car Wheel. 15"x7" Seneca Falls Tool Room.

#### MILLERS

No. 11/2 Knight Vertical.
No. 11/2B Kearney & Trecker Universal
No. 2 Brown & Sharpe Universal (2).
No. 3 Van Norman Duplex (2)
No. 3B Brown & Sharpe Plain.
No. 4B Brown & Sharpe Plain.

#### PRESSES

No. 1½ Bliss Cam-Action Drawing.
No. 3 V & O Geared M.D. Inclinable.
No. 4 N-Bliss, Geared M.D.

#### TURRET LATHES

No. 3 Warner & Swasey Fox Type.
No. 5 Foster, Timken Bearing, M.D.
10" 2-spdle. J & L. Steel Head.
No. 5A Potter & Johnston Automatic.
No. 10 Bardons & Oliver, M.D.
24" Steinle, s.p.d., 614" hole.
26" Libby, s.p.d., 71/2" hole.

#### MISCELLANEOUS

24" Bullard, New Era Boring Mill. 11" Gleason Bevel Gear Generator. No. 1½ Landis Univ. Grinder. 3¼" Gridley—Model L—Single Spindle.

# MILES QUALITY TOOLS

1" & 1-% New Brit. 6 spindle
1" Cleveland Mod. J, dbl. end
14", 1-4", 2-5" & 314"Grid.
1½" cone, 4 spindle
1½" Cleveland "M." 4 spdl.
1½", 2", 2", 2", Nat. Acme, 4

6"x16", 10"x52", 12"x36", 12" x72" Landis 6"x32", 10"x36", 10"x50", 14" x50" & 14"x72" Norton 12"x44" Modern 12"x44" No. 3 B. & S. univ. 12"x36" No. 2½ Bath univ. No. 2 Norton tool & cutter No. 184 Greenfield tool & cut. 6"x18", 10"x52", 12"x38", 12" x2" Steinle 3"x38" lones & Lamson 2 spindle No. 1 Gray met 12"x24" Modern 12"x24" Modern 12"x24" Modern 12"x24" Mo. 2 Norton tool & cutter No. 1 No. 1 Script Springle No. 2 Norton tool & cutter No. 1 No. 1 Script Springle No. 3 Holmes & spill Hammond pedestal Natco 1 & 2 way let No. 1 & Grey met 1 Constant Springle No. 3 Holmes & spill Hammond pedestal Natco 1 & 2 way let No. 1 & Gray met 1 Springle No. 3 Holmes & spill Hammond pedestal Natco 1 & 2 way let No. 1 & Gray met 1 Constant No. 3 Holmes & spill Hammond pedestal Natco 1 & 2 way let No. 1 & Gray met 1 Springle No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 1 & Gray met 1 Springle No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 1 & Gray met 1 Springle No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & Spill Hammond Pedestal Natco 1 & 2 way let No. 3 Holmes & 3 way No. 1 Gray Natco 1 & 3 way No. 1

No. 70 Heald internal 18", 24", 30" & 53" Gard. disc 18" Gardner semi-automatic No. 96 Gardner hydraulic fd. No. 84 Gardner, 24" opp. disc No. 221 Badger, 24" opp. disc 21/4" Wilmarth & Morman drill

5" Barrett cylinder boring MILLERS

No. 4 Cincinnati vertical Nos. 5C & 6 Becker vertical No. 2 Cincinnati No. 24 Cincinnati No. 34 Serical No. 25 Cardner Advicable id. No. 25 Cardner Vertical No. 26 Cardner Advicable id. No. 27 Cardner Vertical No. 26 Cardner Advicable id. No. 27 Cardner Vertical No. 28 Cardner Vertical No. 27 Cardner Vertical No. 28 Cardner Vertical No. 28 Cardner Vertical No. 26 Cardner Vertical No. 26 Cardner Vertical No. 27 Cardner Vertical No. 27 Cardner Vertical No. 28 Cardner Vertical No. 27 Cardner Vertical No. 28 Cardner Vertical No. 27 Cardner Vertical No. 28 Cardner Vertical No. 28

TURRET LATHES

Lipe 2 spdl. chamferers
15" Gleason quenching press
GRINDERS

"X18", 10" x52", 12" x36", 12"

X72" Landis
6" x32", 10" x58", 10" x5 96"x3/16", No. 796 Niagara No. 15 Niagara rotary 30", No. 14 Pettingell rotary 34", No. 1 Gray metal cutter

TAPPERS

Nos. 1, 2, 2X, 2BG Garvin

No. 3 Holmes 6 spdl. tilted

Hammond pedestal & radial

Natco 1 & 2 way lead screw

Landis dbl.

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#### TURRET LATHES

No. 9 Bardon & Oliver, 21/2" Capacity No. 9 Foster, 2 13/16" Capacity No. 6 Warner & Swasey 1" x 6" Acme, Plain Head No. 1 Brown & Sharpe, Motor Driven

#### MILLERS

No. 4A Brown & Sharpe (Heavy) Universal Miller, Vertical Attachment No. 20 Van Norman, Motor Driven No. 1 Kearney & Trecker Plain, Motor Drive in Base-Power Rapid Traverse No. 6 Whitney Hand Millers (10)

#### GRINDERS

No. 72 Heald "Sizematic" Hydrau, Fds. No. 2 Brown & Sharpe Universal No. 33 Abrasive Vertical Spindle

#### SHAPERS

16" Hendey-Gear Box-Arr, M. D. (2) 20" Hendey-Lima Motor Drive 16"-20"-Gould & Eberhardt-C. Dr.

#### LATHES

14"x6' Hendey-Taper- Draw-bar-Collets-Motor Drive 18"x10' Hendey-Taper-Motor Drive

#### PRESSES-LONG-STROKES

No. 10 Bliss-Geared-10" stroke Nos. 1 & 2 Waterbury-Farrel—Geared, 10" strokes

No. 41½A-Waterbury-Farrel-Dial-6" stroke No. 1 Bliss Toggle-Geared-3"/6" str.

No. 3 Rockford-Geared-4" stroke

#### MISCELLANEOUS

Planer-36"x36"x10 Gray-Motor Drive Profiler—No. 12 Pratt & Whitney—Grd. Shear—3/16"x72" W. F. Fdry.—6" Gap

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### "READY TO SHIP"

AMERICAN 24 x 18 Screw Cutting Lathe, Cone Pulley, Double Back Geared. CINCINNATI No. 2 Universal and Plain Millers, countershaft. GARVIN No. 3 Duplex Millers. Cone Drive.

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PRATT & WHITNEY No. 13 Multiple Spindle Drill Press, rectangular head. ALLEN High Speed Sensitive Drills 2, 3, and 4 Spindle.

BAIRD Four Slide Wire Formers, No. 1 and No. 3.

NATCO No. 14 Multiple Spindle Drill, 22 spindles, R. A. Head, 18\*x26\* Table 22\*x30\*, S. P. Drive. Serial 11,200.

BROWN & SHARPE No. 2, Hand Screw Machines, c./s. drive, Nos, 0 & 1 Motor Drive.

BROWN & SHARPE No. 2 Surface Grinders. BETTS 18º Crank Slotter, countershaft drive. Will slot center of 85º diameter.

GOULD & EBERHARDT Crank Shapers, Cone Drive 24"-16". CLEVELAND 23/4 Automatic Model A.

GRIDLEY 13/4 4 Spindle Automatic Model F, countershaft drive.

LOY & NAWRATH 10 ft. Power Squaring Shear, 3/16 capacity, m. d. DREIS & KRUMP 6 ft. Box and Pan Brake, Motor Drive, 10 gage.

NIAGARA 7-B Geared Inclinable Power Press, 5" stroke.

YATES-AMERICAN Universal Saw Tables No. 30.

Other just as desirable tools in our large stock. Send for catalog.

MORRIS MACHINERY COMPANY, INC.

97 Chestnut Street

#### NORTON MOTOR DRIVEN CHIMDERS

	CARGETA BARRE	16.7
6"x18"	10"x72"	16"x50"
6"x32"	10"-15" gar	px72" 16"x72"
10"x18"	10"x96"	18"x96"
10"x24"	10"x120"	18"-24"ggpx96"
10"-15"gapx24	1" 14"x36"	21"x96"
10"x36"	14"x50"	21"x144"
10"x50"	14"x72"	23"x120"

#### BORING MACHINES

No. 2 Coffman, 3¾" bar, motor drive. No. 2 Barrett, 5" bar, extension bed.

#### BORING MILLS

30	Killid	
42"	Gisholt	
48"	Gisholt.	
48"	Colburn.	
52"	Gisholt.	
54"	Colburn.	
60"	Colburn.	
60"	Gisholt.	M.D.
72"	Bickford.	

King, motor drive. 72" Niles, Bement, Pond, M.D. 10' Niles.

#### DRILLS

No. 2 Colburn, 3 6 4 Spindle. No. 4—5 spdl. Foote-Burt. No. 1, No. 3, No. 4 Baush Multiple. 3' Western Plain Radial. 4' Western, motor on column. 4' Carlton plain.

5' American triple purpose.
6' American Plain
6' Western Plain Radial.
7' American Full Universal.
7' & 8' Western heavy Radial.

#### GEAR CUTTERS

No. ½, No. 1 Pfauter Hobber. No. 2, No. 3 Pfauter Hobber. No. 2—60" Goss Hobber. No. 3, 4, 5, 6 Brown & Sharpe. Nos. 6, 61 & 645 Fellows. No. 6.4—Cinn. Auto. 18" Gleason Bevel Generator, m.d.

#### GRINDERS

No. 21/2 Universal (Bath type). No. 4 Landis Universal. No. 70 Heald Internal. No. 70 Heald Internal.
No. 16—26" Blanchard Vertical Surface.
No. 16—26 Blanchard Auto. Vert. Surface. No. 16-A Blanchard Auto. Vert. Surfac No. 22-12" Heald Rotary Surface. No. 25-16" Heald Rotary Surface. No. 3 Barber-Colman Hob Sharpener. 16" x 32" Landis Crankshaft. Vert. Surface.

#### LATHES

16"x8' Lodge & Shipley, Taper. 16"x8' Flather. 16"x8' Flather. 16"x8' Flather. 16"x8' Lodge & Shipley. 18"x12' American. 20"x10' Lodge & Shipley. 20"x12' Lodge & Shipley.

#### LATHES—Continued

24"x16' Lodge & Shipley. 24"x18' American 24"x20' Lodge & Shipley, Taper. 24"x22' Lodge & Shipley, Taper. 27"x18" American, Taper. 27"x18" Sidney, Taper. 30"x12" Lodge & Shipley, taper att. 30"x12' Lodge & Shipley, 16 36"x16' American, taper. 36"x21' American. 36"x24' Bradford, taper att. 40"x12' Fifield.

40 x12 Fineia.
46"x30" Houston, Stanwood & Gamble, m.d.
60" New Haven turning & boring.
20"'40"x10" Rahn - Larmon Geared Head
Sliding Bed Gap.

#### MILLERS

No. 1½A Milwaukee. No. 2 Brown & Sharpe. No. 2 Cincinnati Universal. No. 3 Kempsmith. No. 5-B Becker Vertical. No. 6 Becker Vertical. No. C-2 Becker Vertical. No. 4 Hendey Lincoln. Type "B" Briggs Lincoln. Type "B" Briggs Lincoln.
No. 7-H Becker Lincoln.
No. 8 Hendey Lincoln.
No. 12 P. & W. Lincoln.
No. 3 Garvin Duplex. No. 3 Garvin Duplex. 24" Cincinnati Duplex. No. 33 Becker Brainard. 36"x36"x12" Newton Duplex. 38"x44"x20" Ingersoll Slab. 72"x16"x14" Ingersoll Slab. No. 1 Smalley-General Thread Miller.

#### **PLANERS**

24"x24"x6' Rockford. 24"x24"x12' Gray. 30"x30"x18' Cincinnati. 36"x36"x8", 18" Cincinnati. 42"x42"x30" Niles-Bement-Pond, Rev. M.D. 44"x36"x12' Gray. 48"x48"x16' Niles-Bement-Pond. 60"x48"x20' Hamilton. 72"x60"x16' American.

PRESSES

No. 01 & No. 1 V. 6O., M.D. No. 11/2 V. 6O., M.D. No. 20 Bliss, M.D. No. 21 Bliss.

No. CG-24 Ferracute, Geared, M.D. No. 3 & No. 5 V.&O., grd., M.D. No. 58 Toledo Nosing presses.

#### TURRET LATHES

No. 4-1½" Warner & Swasey Univ. No. 6-2¼" Warner & Swasey. 18" Libby, Motor Drive. 3"x36" Jones & Lamson Steel Head. 24" Warner & Swasey. 24" Steinle. 24" Gisholt. 34" Gisholt, motor drive.

### ILL-CLARKE MACHINERY CO. 645 W. WASHINGTON BOULEVARD, CHICAGO

## liuaranteed

**DRILLS** 

No. 13 Natco, 16 Spindles. No. C-5 Natco, 10 spindles. 28° Cin-Bick, Tap. Att., Gr. Box. 28° Cm-Bick, 1 ap. Att., Cr. Box, 20° Barnes all-grd, self-oiling. 1 & 2Sp. Demco, H.S.B.B. 1, 2 & 3Sp. Allen, P. F. & T. A. No. 1&2 Leland-G. b., tap Att. 51 Dreses Univ. rad., arr. m. d. 61 Carlton Enclosed Head Rad.

M. D. thru gr. box. GRINDERS No. 70 Heald Int., clutch in hd. No. 2 Brown & S. surface, b. d. No. 78 W. &M. Auto, Surf. B D. No. 3 Wil. & Mor. auto., surf. B. No. 7½ Gardner, 30° Disc, B. B. 8 Arter Rot. Surf. M. D. LATHES

Bar 18° Porter Cable, collets.

24°x 12° Schum. Boye q. c. g.

20°x42° Fay & Scott Ext. Gap.

18°x8° Springfield, Q. C. G.

17°x6° Milw. Semi Q C.G. 17"x6' Oliver, Q. C. G.

16\*x6¹ Hendey QCG, Tap. Att. (20° G. & E., B. G. Crank. (5x6² Prentias Q. C. MILLING MACHINES Bolt Cut., 1° Landis Lead Scr. No. 20 Van Nor. Dup., M. D. No. 2, Van Norman Sub Head. No. 1 B. & S. Plain, cone head. No. 1 B. & S. Plain, cone head. No. 2 K. S. Plain, cone head. No. 3 B. & S. Plain, cone head. No. 2 K. S. Plain, cone head. No. 2 K. S. Plain, cone head. No. 3 Memps. Prod. Arr. M. D. 65x46³ Pratt & Whitney Thread. PRESSES
No. 305 Bliss Sett. Side. Sele. Grd. Sele. Ck. T. R. 6° Str. No. 2 L. & J. O.B. I. 1° Stroke. No. 6 Fox Superflex\*

Viv. Spin. 36° Linley, M. D. Saw, 329 Feer. univ. abpg. m.d. Saw, 329 Feer. univ. abpg. M.d.

PRESSES
No. 305 Blins Strt. Side. Sgle.
Grd. Sgle. Ck., T. R. 6\* Str.
No. 2 L & J O.B.I. I \* Stroke.
No. 6 Fox "Superflex".
No. 1 Blins Cam, Fly & Grd.
No. 4 Rockford, o. b. i., Grd.

16" Milwaukee, B. G. Crank. 16" & 20" Steptoe b. g. crank. 20" G & E Hi-Duty SPD Gr. Bx. 24" Stock. b. g. crank, M. D.

Saw, 9x9 Peer, univ. shpg. m.d. Saw, 9x9 Peer, univ. shpg. m.d. Saw, 6x6 Peer, univ. shpg. m.d. Screw Mch., No. 0 B&S H., M.D. No. 1 B. & S. semi-auto, b. d. No. 1 B&S hand.

Shr., 6'z 14 ga. D. & K., eq., m.d. Shear, 10'z 14 ga. D&K Sqr. m.d. Welder, 25 KVA Acme Spot.

# George M. Bernstein & Co.

CLINTON STREET

CHICAGO, ILLINOIS

### 3000 MACHINES IN OUR WAREHOUSES

BORING MILLS

Barrett No. 2 cyl., 5" bar. Bullard 24" Rapid Production

#### DRILLS

P. & W. Nos. 11, 12, 13 Mult. American 3' Radial Morris 4' and 5' Radials. Prentice 6' Radial. Allen 3, 4, 6 sp. B.B. Henry & Wright 4 sp. and 6 sp. Avey 4 syludle No. 2. Urught Drills—many makes and

#### GRINDERS

B. & S. Nos. 1, 2, 3. Univ. Bryant Nos. 6, 10A, 18A, S-A. 2 Sp. Hole, No. 40 Chuck. 2 Sp. Hole, No. 40 Chuck. Disc Grind.—All makes & siz. Nort., 6x32", 10x72", 14x72".

#### LATHES

Hendey Lathes-most sizes. Pittsburgh 32"x24', q.c.g.

MILLERS
h No. 3 Universal,
Sharpe No. 3 Plain Kempsmith

Cinc. Nos. 1, 11, & 2 Univ.
Cinc. No. 2 Hi. Power Pl. SPD.
Cinc. No. 5 Hi. Power Pl. SPD.
Sundstrand No. 3 Rigidmil.
Brown & Sharpe No. 3 Universal
Hender No. 1B Universal
Becker No. 6 Vert. cone drive.
Lincoln Millera et all kinds.
Milwaukee Cam Millera

#### PRESSES

Bliss No. 18, 19 & 20 0.B.I. V. & O. No. 12, 14 D.A.C. In. Wat.-F. No. 6 D.A. Pillar Cam. Stoll No. 67, s.s. Ferracute No. 105 D.A. Terkelsen D.1 150 t. M. Spring. Stand. No. 4-R S.S. Reducing. W-F Long. Stroke for shelbs. Ferracute No. FG-Pd-Pd. Overh. H. Weber St. 10 dec. 10

#### SCREW MACHINES

Grid. 9/16". 74", 11" Mod. G. Clev. 34". 34", 54", 74", 2", 21", 22", 41" & 55" Auto. B.&S. Auto.—most sizes (we

New Brit. 1x5", 15x7" A. Hand Screw M. of all makes & sizes; W. & S., Foster, B.&S. Potter & Johnston Nos. 5A, 6A Chuckers.

J. & L. 3 x 36 Steel Head.

#### MISCELLANEOUS

Broaches, LaPointe 1-2-3-4. Burnishing Barrels, Abbott. Hammers-Board Drop. Hammer — Standard 800 lb. automatic.

Headers, many sizes & makes.

neaders, many sizes & makes. Measuring Machines, P.&W. 12" 24" & 48". Planer-Cincinnati 42"×36#×17" Planer-Detrick & Harvey 36" × 38" × 12" Openside. Planer-Shaper-Lynd Farquhar 26" Openside. Rolling Mill, Robertson 12"×12" for pon-forcements.

Rolling Mill, Robertson 12"x12" for non-ferrous metal. Shapen—from 7" to 32". Shear—Niagara 10-14 Ga. Straighteners—Shuster, for wire. Swagers—12 in stock. Tapper—Threadnut No. 2

auto, nut. Wire Formers, Nilson&Baird.

BOTWINIK BROTHERS,

37-127 WATER ST..

NEW HAVEN. CONN.

# Good Used Machinery

ARC WELDER-G. E. 200 amp., m.d.

BORING MILLS—Niles 36" c. d. Baush 44" m.d. Bullard 51" Vert., 2 hds., Bul-lard 42" Mill, vert.; Rockf. No. 2 horiz., 3\%" Bar; Colburn 42" Vert. 2 Hds.

BRAKES—D. & K., S' Box & Pan, 14 ga. Keene 10' 16 ga. Toggle Press.

DRILLS (RADIAL)—Mueller 2½', Fosdick 2½', Fosdick 4', Carlton 4' all gear box dr.; Hammond 4' sensitive; Mueller 

DRILLS (H. S. B. B.)—H & W 2, 4, 5sp.; Allen 2 & 6-sp.; Avey, Demco, Lel-Giff. 1-sp.; Avey 2-sp.; Aveymatic 2-sp., m.d.

DRILLS (MISC.)—Baker No. 217 (2) 6 No. 314 Hvy. Duty; Hamilton 42" S.H.; Barnez 20" 6 24" 1-sp. 6 20" 4-sp. 6 24" 3-sp. all grd. camel back; P 6 W No. 12 Multu-Sp.; Natoc 20-sp. Rect. head.

GEAR CUTTERS—G & E 60" & B & S 26" s. p. d. automatic spur; Fellows 24" gear shaper. Cincinnati 36" gear cutter. G. & E. 48" gear Cutter.

GRINDERS—P & W 12" vert. surf.; Cin. No. 1½ 6 B & S No. 12 univ. tool, B & S No. 12 univ. tool, B & S Nos. 11616 pl. Head Nos.60865 Int.; Landis 10x90" Plain; B & S 10x48"; 3—Norton 6x32" plain, Head No. 20 Rotary Norton 0x32 pichi, Hedia No. 20 Rotary Surface (3); Badger No. 220, auto. d. e., opposed disc (4); Brown & Sharpe No. 2 surf.; Norton 10" x 36"; Diamond No. 2 Auto. Surf. Ott 5x18" Plain.

KEYSEATERS-Mitts & Merrill No. 5 vert. Davis No. 1; M.&M. No. 0; Catlin No. 2. Catlin No. 4.

LATHES—Monarch 16"x10" M.D.; LeBlond 18x8'; Lehmann 18"x9'; Amer. 22x8'; Davis 22"x10'; L. & S 20"x10'; S.B. & E 20"x10' q. c. q; Flather 22"x10'; Bradford 21"x10'; LeBlond 16"x8'; P & W.1"x10'; Glysten 45"x10'; Monarch 18" 17"x10"; Gleason 45"x12'; Monarch x 8' (2); Ryerson 20x10', m.d.; Mi ler 22"x12', S.B.&E. 30"x12' Q.C.G. MuelMILLING MACHINES—B & S No. 1, Cin. No. 1½, Ohio No. 29, Kemp. No. 3 & Brown & Sharpe No. 3 Universal; Dow No. 1, Ohio No. 20, American No. Brown & Sharpe No. 3 Universal; Dow No. 1, Ohio No. 20, American No. 1½, Becker No. 2, Kemp. No. 3, Cin. No. 3, Hendey No. 3, Be & S. No. 3, LeBlond No. 3-H, LeBlond No. 4 M.D. C.D. & Cleveland No. 2 S.P.D. Plain, Cin. 24" Auto. Plain; Kemp. No. 33 S.P.D. Prod.; Becker No. 6 and Model "B" Vertical; Owen Duplex; Ingersoll M.D. Slab Miller 4 hds.; Cin. No. 4 S.P.D. Pl. Grd. Hd.; Becker No. 5-B Vertical.

PLANERS — Gray 30"x30"x10' 2 heads; Gray 48"x48"x10'; Gray 28"x28"x5' 1-hd.; Pond 32"x34"x10'; Hamilton 60"x 36"x10', 2 heads.

PUNCH PRESSES-Federal Nos. 1, 2, UNCH FRESSES—Federal Nos. 1, 2, 3 o.b.i.; Bliss No. 18 & 19; Ferracute No. P.4; Fer. No. EGF 52 Coining; Willard No. 4A o.b.i.; Swaine No. 38 arch, Swaine No. 37 O.B.I.; Rockford Nos. 2 & 3; and Verson No. 4 O.B.I; Bliss No. 19½; Michigan No. 4 O.B.I; Ning, No. 4, Niag, No. 5, L & J No. 3, Walsh No. 1, O.B.I.

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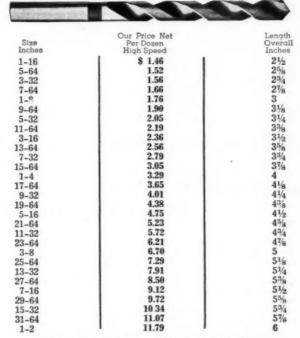
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#### MILLERS

No. 4 Cincinnati Hi.P. Cone 3 S.C.D.D.B.G. No. 4 Cinc. H.P. Cone Univ. 3 S.C.D., D.B.G. No. 2 Kempsmith Univ. Vert. Hd. No. 2 Kempsmith Cone, M.D. No. 3 Kempsmith Universal Cone. No. 2 Hendey Universal S.P.D. No. 3 LeBlond Plain 3 S.C.D.

#### GRINDERS

New Schuchart & Schutte Hob Grinder (Barg). No. 16 Brown & Sharpe Plain. Diamond Face Grinder. No. 1 Diamond Surface Grinder. No. 50, 550, 60, 65, 70 Heald Internal.
No. 75 Heald Internal.
No. 75 Heald Internal.
10°x36" Landis Plain, Self Contained.
10°x36" Landis Plain, S.C.
53" Besley Ball Bearing Vert. Spindle Disc.

#### BORING MILLS

48" Bullard Cone. 60" Gisholt, P.R.T.

#### TURRET LATHES

No. 4 & 6 W & S Plain Cone Drive.

#### MISCELLANEOUS

MISCELLANEOUS
21/4" Landis Bolt Cutter.
No. 4 & 5 Mitts & Merrill Keysecters.
No. 4 & 5 Mitts & Merrill Keysecters.
No. 40 Cleveland Pch. & Shr. 60" thrt., M.D. 8"x"1," Chicago Bending Brake.
No. 92D Toledo D.C. Press.
No. 4A High Speed Riveter New.
2-No. 35 Niagara Presses New.
10"x3/16" Sholl Power Squaring Shear M.D. 6"x6" Peerless Shaping Saw.
25 K W. Federal Sont Wolfer 6"x6" Peerless Shaping Saw. 35 K. W. Federal Spot Welder.

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COMMANI	LLL	MINCHILL	123-
AUTOMAT	IC SCRI	EW MACHINE	S
Clevelands 18-334"	Model	Ser. No. 34000	Driv. Plain Plain
4 - %"-1/2"	B	26300 31000	Plain
No. 00G Full Au No. 00 Full Au	ito.	6800 5988	S.P. Plain
Gridleys 1— %" 4 spdl. 2—114" 4 spdl. 6— 34" 4 spdl. 214"	GGFF	8600 10000 4400 8000	M.D. M.D. M.D. Plain

HAND SCREW MACHINES No. 1 & 3 Fester, plan head Auto. Chuck No. 4 B. & S. Wire Feed Pwd. Feed 14", 18", 21", 24", Gisholt Turret Lathes No. 2 W. & S. Bar feed, collets BD. No. 3 and No. 4 Milholland Geared hd. MD.

DRILLS 2, 4 spdl. Allen H.S. BB., B.F. %" cap. 1 Spdl. Lel-Gif. 14" swing, H.S. BB., % cap. 1 Spdl. Avey No. 2 M.T. H.S., BB., %"cap. No. 3 Barnes Heriz, Radial, 3" cap.

GRINDERS No. 70 Heald Internal Ser. No. 2400, BD.
Webster & Perks, 6"x30" Cyl. self cont. MD.
No. 103 Rivett Internal BD.
No. 2 Norton Cutter Gr. Equip. BD.
No. 1 O.S. Walker Cutter grinder BD.
No. 2 B. & S. Surface, Chuck, Generator
No. 3 Wilmarth & Marmon, wet surf. Gr.Ch.
No. 3 Van Norman 4"x15" Cyl. M.D.

### IMMEDIATE DELIVERY

LATHES Rivett 7%" Bench, Sc. mach. tur. & cut-off
So. Bend 9"x3", 2 chucks, B.D.
So. Bend 13"x5" Pl. Ch. chuck B.D.
So. Bend 13"x5" Pl. Ch. chuck, B.D.
So. Bend 13"x5" Pl. Ch. chuck, B.D.
So. Bend 13"x6" Gap Pla. Ch. Bd.
Hendey 18"x8" Q.C. tap. att. chucks, B.D.
Schumacher & Boye 18"x10" Q.C. tap. att.B.D.
Greaves Klusman 18"x6" plain with turnet
Monarch 18"x6" Geared head, tap. att. MD.
Straylor 12"x5" Geared head, tap. att. MD.
Straylor 12"x5" Geared head, tap. att. MD.

Simplex 12"x5' Geared head, single pulley dr. MILLERS

42" King Vertical Boring Mill, 2 heads 24" Bullard vertical Boring Mill, side head No. 2 Knight Vertical Univ. with slotter,B.D. No. 2 Knight Vertical Univ. with acceptance No. 2 Knight Vertical Univ. with acceptance No. 9 Kempsmith Plain arbor B.D. Hand Millers, Choo. Whitney Prott & Wright 8" Pratt & Whitney Prod. Mill Arr. M.D. No. 1412 Becker Brainard Univ. BD. PRESSES

25 ton Henry-Wright, dieing, with feeds, B.D. No. 15 Robinson, horn type, table, direct M.D. No. 3 R. & K. O.B.I. 212 str.

SHAPERS

20" Smith & Mills B.G. Vise B.D. 20" American B.G. Vise B.D. 12" Chase, S.P.D. Vise

MISCELLANEOUS

36" Niagara Power Sq. Shear 14 gauge G. & E. Rope Drop Hammer, 75 lb. ca lb. cap. Hammers, High Speed, 3A and 5A Keyseater No. 2 Mitts & Merrill, equipment

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92"x87"x42' N-B-P, Revers. Mtr. Dr. 60"x48"x16' D & H Openside 36"x36"x16' Cleveland Openside 48"x48"x16' Detrick-Harvey Opens. 48" Newton Rotary Planer BORING MILLS

10-16' Betts Hd. Ext. Type Vert. 24" Bullard, Rapid Production 3" Bar Betts Knee Type 334 Bar P & H Drilling, Boring Mill 41/4 Bar Sellers Knee Type

GRINDERS

No. 4 Landis Univ. crankshaft attach. Universal Tool & Cutter Grinders Pratt-Whitney contour cutter Gisholt Universal Tool Grinders 40"x20' Landis Cyl. Grinder, pl. m.d.

LATHES 30"x13' H.S.G Heavy Cone Drive 30"x28' N-B-P Bor. & Turn. Lathe 32"x16' Bridgeford, Geared H., M.D. 32"x18' Bridgeford Grd. Hd., S.P.D. 26/40x20 McCabe, Double Spindle 42"x22' N-B-P, Grd. Hd., M.D., Tap. 42"x22' Bridgeford, Grd. Hd., M.D. 60"x40' Wright, two carriages, M.D. 90" N-B-P Driving Wheel, double quarter

MILLERS

No. 24 B & S Sliding Head, Plain No. 2 Garvin Duplex No. 14 Cochrane Bly, slot. hd., M.D. 6x48 & 6x80 P & W Thread Miller 48" N-B-P Rotary End Miller

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Automatics
1147, 4 spindle Cone.
2" Cleveland Model A., s.s. (3).
3" Model B Natl. Acme. m.d. (2).
Cleveland Model A, 114" (5)
Cleveland Model B, 114" (5)
Cleveland Model C, 114" (5)
Cleveland Model C, 12" (2)
No. 34 New Britain Chucker.
New Britain 6 spin, 1" cap. M.D. M.D., New Britain 6 spin., 1" cap. M.D., cutoff (2) Brown & Sharpe, O, OO, OG, OOG, No. 2 (30).

2 spdle. Henry & Wright, No. 3 M.T., P.F. 2, 3, 4 spdl. H & W., Allen, Lel. G., Avey (33) 3, 4 & 6 spdl. All. H.Ssp., P.F., Tap. At. 1.t. 4 spin. No. 2 Colburns, No. 3 MT, (2) 4 spdl. Cincin. Bick. dir., motor dr Moline Hole Hog, various sizes (5). Fox Mult. spdl. with Tapp. att. (4). Pratt & Whitney double end, m.d. & m. dr. Gear Equipment

. 36 S.T. G. & E., Auto., 4 s. Gr. R., m.d.

Grinders

No. 34 Van Norman Internal. No. 70 Heald Inter., m.d. ( No. 80 Heald Internal m.d. (3). Drum Type, m.d. (2). Arter No. 132

Planers 24"x24"x6' Gray Dble. Hsg., b.m.d. 36"x60"x14' American, widened to 60".

Presses

Presses
2-ton Flexible, m.d.
10, 25, 50 ton Henry & Wright with dbl. rl. fds.
No. 2½ V & O, OBI Didl feed, M.D.
No. 3½ Toledo, O.B.I., m.d. & m.
No. 4 Loshbough Jordan
No. 5A Toledo, O.B.I., flywheel type.
No. 6-I Cleve. O.B.I., flywheel type.
No. 6-I Cleve. O.B.I., G.M.D.. (4): No. HG
HG Cleve. (3). Equ. No. 6-O.B.I.
No. 5 Canco. 8" str., S.S., bk., grd., m.d. &m.
No. 52 Toledo Arch. 29x29 bolster.
Nos. 56 Toledo S.S., sale cr.
No. 62 Bliss, S.S., S.C.
No. 62 Floedo, S.S., Bk., Grd., m.d.
No. 63 Michigam, S.S.
No. 24 Toledo, cam. draw., m.d. & m.

No. 24 Toledo, cam. draw., m.d. & m.
No. 24 Toledo, cam. draw., m.d. & m.
No. 4A Bliss swinging adj. table, m.d. & m.
No. 14 Toledo Horning, grd. mtr. dr.
P.2, P.3, P.4 Ferra., solid back, q.m.d. (12)
DG-53 Fer. S.S., S.C., B.G., G.M.D.
Bliss Consolidated No. 3, 4, 5, m.d.

Shapers

16" Ohio 20" Cincin. Shaper, back grd.

SPECIAL

No. 551/2 Toledo St. Side, Tie Rod Press, g.m.d. & m., double roll feeds, 88 ton pressure

Gardner db. spdl. op. m.d., hyd.id. ley Vert, Disc m.d. & m. . 6, 12A & 20 Bryant (12). and 16" x 36" Cinc. Pl. Cyl. (2). Nes. 6. 20" Badger Face, hyd. feeds, table travel 44" Oakley Tool & Cutter (2). No. 3 Landis Universal Grinder. 16"x42" Landis Crank M.D. like Landis Crank M.D. like new.

Lathes

Lathes
Fay Automatics, 14" standard (7).
Gisholt Simplimatics, m.d. (2).
No. 3 Foster Gd. Hd., Turret.
No. 4 AC LeBlonde Crank Shait M.D.
No. 5 Foster Turret.
16"x6" Monarch Geared Head Lathe.
Nos. 5A. 6A P & J Auto., m.d. (12).
No. 7A Potter & Johnson Automatic
No. 2, 4, 6 Warner & Swasey Turret (8).

No. 2 Brown & Sharpe Vertical. No. 3 Cincinnati Plain. Model B Becker Vertical, with rotary table Model B Becker Vertical, with rotary table No 3 Kent Owens, Power feed. m.d.&m. Nos. 1, 2 & 3 Craftsman Rot. Prod. &m. Nos. 1, 2 & 3 Craftsman Rot. Prod. No. 4 Cincinnati Pain Mill. 18" Cincinnati Semi Auto., 21. & dup. hds. No. 21 Brown & Sh., Prod. s.p.d. No. 12 P & H Bering, floor type, 7" dia. quill. m.d. 59% dia. spindle nose. Type A, 46"x8" Goolev & Edlund Prod. Mill.

", 14 ga. Niagara, b.d.
"4" Toledo, b.d.
"4" Pexto Gap Frame Lathe Type, m.d.&m. 8', 14 10' %" Pexto Gap Frame 10', 16 ga. Streine Shear.

1" National, Steel Bed. 11/2" Acme, steel bed, m.d.

Welders 175 KVA Thomson Projection (2). Federal, 125 KVA, M.D. 200 KW Federal Projection Spot. 150 KVA Thompson Butt Welder. Spot. Taylor Winfield Automatic, 20-27 KVA (6), motor driven, late type.

aylor Winfield, National, Federal m.d. Butt Taylor

(12) Taylor Winfield 4 way Flash Welder m.d. Taylor Winfield, Federal Thomson Spot (34). Taylor Winfield Gun Type, Portable.

Miscellaneous Balancer, 18" Gisholt Static, Vert. Boltaut., 2 sp., 34" cap., Landis, ld. scr. att. Broach, No. 4 Lapointe. Bolteut, 2 sp., 34" cap., Landis, k Broach, No. 4 Lapointe. Broach, V-18 American. Chip Separator, McKenzie, M.D. Die Sinker, No. 2 Pratt & Whitney

Model J Doall, m.d. 6x6 Racine Hack Saw Elec. Mule, El Elwell Parker. 3 Wil. m.d.&m., 6" cap.

AND A COMPLETE STOCK OF FINE UP-TO-DATE EQUIPMENT

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#### GEARED HEAD ENGINE LATHES

14"x6' Prentice 14"x10' Lodge & Shipley, 12 speed head

14"x10" Lodge & Shipley, 12 speed hear 16"x8" American, taper 18"x10" American, taper 18"x10" American, taper 18"x12" American, taper 18"x14" American, taper 18"x8" Monarch, m.d. in base, taper 18"x10" Monarch, m.d. in base, taper 18"x10" Monarch, m.d. on head, taper 20"x8" American, 12 speed head, taper 20"x8" American, 12 speed head, taper 20"x12" American, 12 speed head, taper 20"x12" A Bland, 12 speed head, taper 20"x12" A Bland, 12 speed head, taper 20"x15" A Bland, 12 speed hea

20"x8" American, 12 speed head, taper 20"x12" American, 12 speed head 21"x16" LeBlond, 12 speed head, taper 24"x10" American, 8 speed head, taper 24"x12" American, 8 speed head, taper 24"x12" Monarch, 8 speed head, taper 26"x12" Betts-Bridgeford Oil Country, taper 20"x12" Lodge & Shipley, 12 speed, taper 24"x15" peed. 24"x15' Reed

24"x18' Lodge & Shipley Patent Head 24 x16 Loage & Shipley Part 26"x16' Bradford, taper 26"x18' Betts - Bridgeford taper, 10" hole in spindle 36"x24' American, 16 speeds Oil Country,

SHAPERS

Alba, gear box, new 10" AiDa, geur box, 20" Hendey, cone 20" Queen City, cone 16" Davis, gear box 24" Barker, cone

4" Cincinnati, cone 24" American, gear box, vee ram, auto

An oiled

Rockford, cone
BORING MILLS 35" Bullard New Era, m.d., 1 rail head, l side head, late type

1 side head, late type
30" Gisholt, cone, 1 rail head
42" Colburn, m.d., 2 heads, p.r.t., late
42" Gisholt, gear box, 2 heads
42" King, m.d., 2 rl., 1 side hd., p.r.t.late
48" Niles-Bement-P. Car Wheel Borer, belt
48" Niles-Bement-P. Car Wheel Borer, belt
48" Niles-Bement-P. Car Wheel Borer, belt
48" Niles-B-P. Horiz., m.d., 5½" bar
No. 4 Niles-B-P. Horiz., m.d., 5½" bar
No. 40 Landis Fl. Type Horiz., 4" bar, m.d.
Niles-B-P. Cyl. Borer, m.d., 12" main bar
42" King, 1 swivel, 1 turret head on rail

**PLANERS** 

Morton Traveling Head, m.d., 48" str 24" Cincinnati Crank, m.d., 1 head 24"x24"x6" Ohio, belt, 1 head 30"x30"x8" Pond, belt, 1 head 30"x30"x12" Gray, m.d., 2 heads 32"x32"x8" Gray, belt, 1 head 36"x36"x10" Niles, revers. m.d., 3 head 48" stroke 36"x36"x10" Niles, revers. m.d., 3 heads 36" wid. to 42"x12" Cinc., rev. m.d., 3 hds. 36"x36"x12" Niles, m.d., 4 heads 39"x39"x10" Cinc. Forge Type, belt, 2 hds.

No. 3 Cinc. Vert. Dial, m.d. in base, Timk. Bear., Nat. Std. Spdl., very late No. 4 Cinc. Vert., m.d., flanged spdl. No. 2A, 4B, 5C, 6 Becker Vertical, cone No. 2 Cleveland Plain, s.p.d. No. 2H Brown & Sharpe Plain, cone No. 2H Brown E Sharpe Plain, cone No. 3 Kempsmith Plain, cone No. 4 Cincinnati Plain, cone No. 4 Cincinnati Plain, cone No. 18 Brown & Sharpe spd. No. 4 Cincinnati Flain, cone No. 13B Brown & Sharpe, s.p.d. 48" Cinc. Worm Dr. Plain Automatic, m.d. 48" Oesterlein Tilt. Offset, m.d., Timk. Br. No. 58—108 Cincinnati Plain Hydromatic, with 3 vertical spindles, m.d., very late 24" Cincinnati Plain Automatic, m.d. 24" Cincinnati Duplex Automatic, be belt 36"x36"x8" Ingersoll Comb. Vertical and Horizontal, adjustable rail type C66A Newton 3 spindle Continuous, s.p.d.

No. 6 Whitney Hand, belt CONE HEAD ENGINE LATHES

14"x6' Bradford 14"'x8' American 15"x8' LeBlond. 16"x6' LeBlond

15"x8' Sidney 16"x6' Greaves-Klusman

16"x6 Greaves-Nussian 16"x6 Pratt & Whitney 16"x7 P. & W. Tool Rm., tap. col. 16"x8 American. 16"x12 American tap, col. att.

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16"x8' American. 16"x8 Cincinnati 16"x8' Monarch 16"x8" Rockford 18"x6" Monarch

18"x8' Hendey 18"x8' LeBlond 18"x8' Mueller

18'x8' Mueller
18'x10' Schumacher-Boye
18'x12' American. 20''x8' American.
20'x10' Lodge & Shipley.
21''x8' LeBlond, taper. 21''x10' LeBlond.
24''x10' Bridgeford.
24''x10' Canada Machinery. Corp..
24''x11' Chard.
24''x12' American. 24''x26' American.

24"x12" American. 24"x26" American 24"x12" American. 24"x26" American 24"x12" Schumacher-Boye. 36"x10" Schu-B. 24"x12" S.-B. 36"x10" Schumacher-Boye 24-48"x16" McCabe 2 in 1

24-48"x16' McCabe 2 in 1 24"x16' Schumacher-Boye 26"x12' Boye & Emmes 27"x16' Bridgeford 36"x18" Niles

SURFACE GRINDERS

No. 25A Heald, m.d., 16" chuck No. 10U Norton Lapper, m.d. 12x36" Diamond Auto. Surface, No. 10U Norton Lapper, m.a. 12x36" Diamond Auto. Surface, n 18x48" Diamond L.D. Face, m.d. 30x84" Diamond H.D. Face, m.d. 454"x42"x12" Gray, revers. m.d., 436"x36"x86" Cincinnati, belt 2 heads m.d.

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54" Bridgeport Knife, belt 60" Bridgeport Face, s.p.d. 6' Reed-Prentice Vertical, m.d. Springfield Planer Type, m.d.

INTERNAL GRINDERS

INTERNAL GRINDERS

No. 3 Bryant Semi-Automatic Hole, m.d.
No. 4 Cinc. Vert., m.d., flanged spdl.
No. 5 Bryant, belt
No. 6 Bryant, belt
No. 75 Heald, belt
No. 10 Bryant Semi-Automatic Hole, belt
No. 11 Giddings & Lewis Teromatic, 3m.d.
UNIVERSAL GRINDERS
No. 1 Wilmarth & Morman, belt

No. 1 Wilmarth & Morman, belt No. 2 Brown & Sharpe, belt No. 2 Landis, belt 10x18" Landis, belt No. 13 Brown & Sharpe, belt

3 Gallmeyer & Livingston, m.d. PLAIN CYLINDRICAL GRINDERS 6x18" Landis, m.d.

6x30" Norton, m.d. 6x32" Brown & Sharpe No. 11 6x32" Brown & Sharpe No. 11
6x32" Norton, belt
7x72" No. 16 Brown & Sharpe, belt
10x18" No. 14 Brown & Sharpe, belt
10x36" Landis Integral Cam, m.d.
10x36", 10x52", 10x72" Landis, m.d.
10x36" Norton, m.d. 10x50" Norton, m.d.
12x36" Cinc. belt. 16x48" Cincinnati, belt

12x72" Landis, m.d.

14x72" Norton, m.d. 16x52", 16x72", 20x

20x144" Landis.

16x52", 16x72", 20x144" Landis, m.d.
TOOL & CUTTER GRINDERS
Gisholt Tool, belt
Gould & Eb. Gear Cutter Grinder, belt
No. 1, 1½ Cincinnati, belt
No. 1 LeBlond, two motor drive
No. 1 Wilmarth & Morman, 3 motor drive

No. 1 Wilmartin o Morman, 3 motor drive No. 2 Norton, belt No. 2 Lumsden Tub Type, belt No. 4, 5, 41 Oliver Drill Pointers,m.d.inb. No. 23 Brown & Sharpe Gear Cutter, belt Sellers Drill, m.d., 3" cap

Sellers Drill, m.d., 3" cap
Gleason Cutter ,belt
New Yankee Twist Drill, m.d.
18" Cincinnati Face Mill. m.d.
GEAR CUTTERS AND HOBBERS
No. 7 Fellows H.S., m.d.
No. 6, 61, 62, 612, 615 Fellows
Gleason Bevel Gear Tester, belt
6" Gleason Straight Tooth, belt
No. 1 Lees-Bradner Prod. Hobber, m.d.
No. 3, 12 Rarber-Collagn

No. 1 Less-Bradner Prod. Hobber, m.a. No. 3, 12 Barber-Colman No. 3, 12 Barber-Colman No. 3-26" and 36" B. & S. Gear Cutters No. 3 Heavy Brown & Sharpe, m.d. No. 3-26" Cincinnati, belt No. 5A Less-Bradner, 14" size, belt No. 6-60 & 6-72" B. & S. Gear Cut., m.d. 16" Cincinnati Gear Hobber, m.d. 36" Gould & Eberhardt Gear Cutter, s.p.d.

Schuch. & Schutte Gear Tooth Rounder, bit PIPE MACHINES

No. 2 Bignall & Keeler, m.d., 2" cap. No. 4 Big, & K. m.d., 4" cap. 2" No. 70 Jarecki, m.d. 2" Landis Dbl. Head Pipe & Nipple, belt

Merrell, m.d.

2" Merrell, m.d. 2" Saunders, m.d. 4" Eaton, Cole & Burnham, belt 8" Bignall & Keeler, belt

SQUARE SHEAR KL 101/2 Niag., m.d., cap. 10' by % ",lates!

RADIAL DRILLS 4', 5' Amer. Triple Purp., gear box on base 6' Amer. Triple Purpose, d.c. drive on arm

American Sensitive, cone Amer. Triple Purpose, d.c. drive Carlton, inclosed head, gr. box on base 5' Dreses Plain, gear box on base

Morris Plain, gear box on base Hammond Jack Knife, belt American Triple Geared, gear box 6' Niles-Bement-Pond Semi-Univ..d.c.dr.

5', 6' Niles-5' Prentice, cone 7' Fosdick, cone

No. 1 Barnes Horizontal, belt No. 1 Barnes Horizontal, belt

BROACHING MACHINES

Oil Gear, type XB10 Hydraulic, m.d.

No. 1, 2, 3 LaPointe, belt

No. 2, 3 LaPointe, gear box

No. 2, 3 LaPointe Double, belt

15 ton Hercules, m.d. PRESSES 300 ton Niles - Bement - Pond Hydraulic Wheel Press No. 496D Toledo Double Crank Toggle

Drawing, 96" between uprights, stroke

Drawing, 96" between uprights, stroke 11½", weight 160,000 lbs.
No. 2881/4B Toledo Double Crank Toggle Drawing, 84" between uprights, weight 175,000 lbs., stroke 15"
No. 94 Bliss Consolidated
No. 93A Toledo S.S., geared
No. 92B Toledo S.S., geared
No. 52B Toledo S.S., geared
DGS3 Ferracute Redrawing
SSI Ferracute Redrawing S51 Ferracute D.C. No. 50-4-36 Minster S.S. D.C. No. 25A Bliss, flywheel

No. 16 Bliss Horning No. 6 Waterbury-Farrel D.C.

No. 5 Bliss Stiles
C4 Ferracute O.B.I.
P2 Ferracute Stiles Type
DD2 Ferracute Double Action Drawing
D2 Ferracute Single Acting Drawing No. 2S Consolidated O.B.I. No. 11/2 Bliss Cam Waterbury-Farrel O.B.

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Press Brake, Chicago Steel, 5 ft. 14 ga. M. D. with motor

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Turret Lathe, Warner & Swasey No. 4 Universal Bar feed

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Cylindrical Grinder, Brown & Sharpe No. 10, motor drive with motor

Duplex Mill, Cincinnati 28" Semi-Automatic

Grinder, Cincinnati 10x36" Universal, M.D. with motors

## ACME EQUIPMENT CO.

## E55LEY achine Tools

## **Special Offerings**

Bar cutter, No. 8 Buffalo, cap. 2<sup>1</sup>/<sub>4</sub> rds.. 2<sup>1</sup>/<sub>2</sub>" sq., 5<sup>n</sup>x5<sup>n</sup>x<sup>5</sup>/<sub>8</sub>" angles, 6<sup>n</sup>x<sup>7</sup>/<sub>8</sub>" flats.

Alligator Shears (2), Lewis, capacity 3" and 5" round, 18" and 24" blades.

10<sup>th</sup> Dreis & Krump, 3/16<sup>th</sup> capacity squaring shear, m. d.

24"x14' Lodge & Shipley lathe, cone drive.

THE E.L.E55LEY MACHINERY CO 831 W. EVERGREEN AVE - CHICAGO ILL

#### IMMEDIATE DELIVERY

14 x 50 Norton Grinder. Belt drive No. 3 Kempsmith Plain Mill. M. D. 4 spindle No. 2 Colburn Drill Press 36" Metal Band Saw. M.D. 1, 2, 3 and 4 spindle highspeed Drills 8 x 84" Lo Swing. S. P. D. Natco Multiple Drills, all sizes

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3131 E. JEFFERSON

DETROIT, MICHIGAN,

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28\*x10¹ Hamilton Lathe, Q. C., G. Cone.
20\*x8¹ Hamilton Lathe, Q. C. G., T. A., Cone.
14\*x6¹ American Lathe Q. C. G., Cone.
No. 2A Brown & Sharpe Universal Mill.
2½° Acrne Turret Lathe, Wire Feed Cone.
16\*x42° Landis Crankshaft Grinders, Self-contained Countershafts, Motor Drive.

No. 2 Morse Universal Grinder 12\*x30\*. No. 4 Landie Universal Grinder 12\*x66\*. 16° G, & E. Shaper, Cullman, Motor Drive.
12°x42°, 12x52° Landis plain Grinders.
4½° Morris Radial, Gear Box, S. P. D.
3½° American Radial, Gear Box, Swinging and Swivel Table, S. P. D.
No, 1 Hoosier Heavy Duty Drill, 2° Cap. M. D.
No. 3¾°x52° L. & A. Shear, 18° Gap.
D-2 Colburn Drill No. 5 M. T.

24°x24°x8' Cincinnati Planer, I Head.

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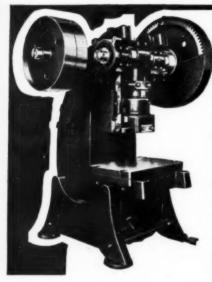
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## **Index To Advertisers**

Aaron Machinery Co.	221
Abart Gear & Machine Co.	174
Aeme Equipment Company	250
Aeme Industrial Co.	143
Aeme Industrial Co. Air-Way Pump & Equipment Co.	119
Alco Tool Company	215
American Nickeloid Co.	143
American Red Cross	186
Anderson Bros. Mfg. Co.	128
Armglo Company	172
Armglo Company Armstrong-Blum Mig. Co. Inside Front C	over
Armstrong-Bray & Co. Armstrong & Bros. Co., R. S.	174
Armstrong & Bros. Co., R. S.	223
Armstrong Bros. Tool Co.	4
Atlantic Mchy. Corp.	252
Atlas Press Co. Auto Moulding & Mfg. Co.	49
Auto Moulding & Mfg. Co.	176
Avey Drilling Machine Co.	87
Baldor Electric Co.	175
Banner Manufacturing Co.	214
	228
Bates Marking Devices, H. O.	156
Baumbach Mfg. Co., E. A.	197
Beatty Mch. & Mfg. Co.	163
Behlen Machinery Co.	223
Behlen Machinery Co. Bennett-Rafkin Machine Tool Corp.	231
Berg & Co., C. F.	179

Berkeley Equipment Co.	117	•
Bernstein & Co., Geo. M.	236	,
Beverly Shear Co. Black Diamond Saw & Meh. Works	210	ı
Black Diamond Saw & Meh. Works	127	•
Blaner Co., John	172	
Blank & Buxton Machinery Co.	260	i
Bleser Machinery Co.	221	
Botwinik Brothers	236	,
Bradley Machinery Co.	224	
Bremil Mfg. Co.	154	
Brewster & Co., Wm. C.	148	
Bridgeport Machines, Inc.	64	
Brooks Co., B. D.	225	
Brown & Sharpe Mfg. Co. 61	-153	
Brown Machinery Co.	240	
Brown Machinery Co. Bryant Chucking Machine Co.	53	
Buffalo Forge Co.	14	
Burgess Battery Co. Burke Machine Tool Co.	155	
Burke Machine Tool Co.	154	1
Burr & Son, J. T.	183	
Canedy-Otto Mfg. Co.	18	4
Carboloy Co., Inc. 41	-140	
Carroll & Son, Wan.	126	
Cerro de Pasco Copper Corp.	203	
Chicago Die Casting Mfg. Co.	195	1
Chicago Pneumatic Tool Co.	75	

Chicago Tool & Engineering Co.

Index To Advertisers, Con't.	Gardner Machine Co. 72 Gaston Power Tools Co. 152
much to havetusers, con t.	Gaston Power Tools Co. 152
Clausing Manufacturing Co. 169	General Blower Co. 221
	Geometric Tool Co. 35 Gilmore Machinery Co. 227
Colonial Broach Co. 76 Colwell, Co., S. G. 152	Gits Brothers Mfg. Co. 125
Colonial Broach Co.   76	Glenzer Company, J. C. 83
Cincinnati Machinery & Supply Co. 245	Globe Machinery Co. 227
Cincinnati Tool Co. 205	Globe Tapping Machine Co. 162
Cone Automatic Machine Co. 43	Goodnow Foundry Co., L. H. 224
Common Chutch Co	Gits Brothers Mfg. Co. 225 Glenner Company, J. C. 83 Globe Machinery Co. 227 Globe Tapping Machine Co. 162 Goodnow Foundry Co., L. H. 224 Gorton Machine Co., Geo. 94-138 Graham Mg. Co. 164
Center, C. C.	Graham Mfg. Co. 164 Grant Mfg. & Machine Co. 158
Cullman Sales Co. 110	Greenerd Arbor Press Co. 127
Craley, C. C. 184 Cullman Sales Co. 110 Cullman Wheel Co. Back Cover	Greenerd Arbor Press Co. 127 Grobet File Corporation of Am. 167 168
Cushman Chuck Co	***************************************
	Halco Products Co. 62-135 Hamilton Tool Co., The 138-140 Hammond Machinery Builders 209
Daley & Sibley Mchy, Dealers 234	Hamilton Tool Co., The138-140
Dalzen Tool & Mfg. Co. 144	Hammond Machinery Builders 209
Daniels, C. R. 228	Hanna Engineering Works 6
Danly Machine Specialties 170	Handing Bathan Inc.
Davis Mchy. Co. 222	Hart Machine Co. 100
Daley & Sibley Mehy, Dealers         234           Dalsen Tool & Mfg. Co.         144           Daniels, C. R.         228           Danly Mackine Specialties         170           Davis Mehy, Co.         222           Davion-Rogers Mfg. Co.         185           Dearborn Gage Co.         161           Dearborn Gage Co.         254           Delta Equipment Co.         254           Delta Manufacturing Co.         13           Desemond-Stephan Mfg. Co.         137           Despended Vere Co.         177           Detroit Fower Serewdriver Co.         177           Detroit Stamping Co.         118           Dony Machinery Co.         228           Douglas Machinery Co.         203           Dreis & Krump Mfg. Co.         Inside Back Cover           Premed Mapo facturing Co.         145	Hartford Special Machinery Co. 154
Dearborn Lage Co	Hanna Engineering Works   6
Delta Equipment Co.	Harvey Mfg. Company 152
Delta Manufacturing Co. 15	Hasco, Inc. 240
Desmond.Stephan Mfg. Co. 137	Harvey Goldman & Co. 244 Harvey Mfg. Company 152 Hasco, Inc. 244 Haskins Company, R. 6. 59 Heimann Mfg. Co. 160 Heuser Manufacturing Co. 134 Hill-Clarke Machinery Co. 235
Despatch Oven Co. 82	Heusen Manufacturing Co. 134
Detroit Power Screwdriver Co. 177	Hill-Clarke Machinery Co. 235
Detroit Stamping Co. 118	Hilliard Corp. 114
Dony Machinery Co., D. E. 228	Heluser Manufacturing Co. 134 Hill-Clarke Machinery Co. 235 Hilliard Corp. 114 Hobart Brothers Co. 1 Hotal Auditorium 205
Dreis & Krump Mfg. Co. Inside Back Cover	
Dremel Manufacturing Co. 145 Drive-All Mfg. Co. 132 Durable Punch & Die Co. 142 Draw Manufacturing Co. 142	Hotel Essex 204
Drive-All Mfg. Co. 132	Hotel Lafayette 205 Hotel Philadelphiam 178
Durable Punch & Die Co. 142	Hotel Wolverine 179
	Howarth Machinery Co., C. C. 226
Duro Metal Products Co. 21  Dyer Welder & Engineering Co. 139	Hotel Wolverine 179 Howarth Machinery Co., C. C. 226 Hyman & Sons, Joseph 222
Eastern Machinery Co. 248, 249 Economy Machine Products Co. 182	Ideal Commutator Dresser Co. 213
Economy Machine Products Co. 182	Illinois Testing Laboratories, Inc. 114
	Industrial Engineering Co. 214
Electromatic Products Co. 211	Indianapolis Machinery & Supply Co. 238 Industrial Engineering Co. 214 Inland Machinery Co. 251
Electromatic Products Co. 211 Elgin Tool Works 20 Elyria Belting & Machinery Co. 226 Emerman, & Co., Louis E. 228 Erickson Steel Co. 176	Inland Machinery Co. 251 Interstate Machinery Co. 242-213 Interior Steel Equipment Co. 149
Emerman, & Co., Louis E. 228	Interior Steel Equipment Co. 149
	International Mchy. Co. 250 Iroquois Machinery Co. 250
Errington Mechanical Laboratory 135 Esco Eng. & Sales Co., Inc. 215	Iroquois Machinery Co. 250
Esco Eng. & Sales Co., Inc. 215	
Esaley Machinery Co., E. L. 250 Evans Flexible Reamer Corp. 148	
Etteo Tool Co. 91	Jackson Machine & Tool Co. 102
Etteo Tool Co. 91 Excelsior Tool & Machine Co. 206	Janette Manufacturing Co. 159
	Jarvis Co., Chas. La
	Jarvis Co., Chas. L. 71 Johnson & Sons Machinery Co., Wm. C. 169-222 Jones Machine Tool Co. 224
Factory & Mill Supply Co., Inc. 227	***************************************
Failor-Strafer Machinery Co. 222	
Failor-Strafer Machinery Co. 222 Falk Mill Supply Co. 251	K-O Products Co. 196
Fameo Machine Co. 198	V -1 T P 6.01 - C- 101
Federal Press Co. 256	Karney & Trecker Corp. 37 Klauber Machinery Co., E. L 226 Knu-Vise, Inc. 173 Koebel Diamond Tool Co. 164
Flexrock Company         193           Flynn Manufacturing Co.         62           Ford Manufacturing Co., M. A.         171           Foredom Electric Co.         200	Klauber Machinery Co., E. L. 226
Ford Manufacturing Co., M. A. 171	Knu-Viee, Inc. 173
Foredom Electric Co. 200	Koebel Dismond Tool Co 164
Fray Machine Tool Co. 151 Fulflo Specialties Co. 113	
Fulflo Specialties Co	
	L-W Chuck Co. 129
	Lafayette Machinery Corp. 253 Lake Machinery Co. 228-252 Lang Machinery Co. 223
Galland-Henning Mfg. Co. 107 Gallmeyer & Livingston Co. 80	Lake Machinery Co. 228-252
Gallmeyer & Livingston Co. 80	Lang machinery Co 223

## Index To Advertisers, Con't.

Laurens Bros. Lee & Son Co., K. O. Lima Electric Motor Co. Littell Machine Co., F. J.	23
Law & Son Co. K. O.	71
Lima Flastric Motor Co.	133
Littell Machine Co., F. L.	171
Loren Engineering Co.	19
Loshbough, Jordan Tool & Meh. Co.	120
Lowe Co. Chas. E.	22
Lufkin Rule Co.	114
Latteil Macuiae Co., F. D. Logan Engineering Co. Loshbough-Jordan Tool & Meh. Co. Low Co., Chas. E. Lafkin Rule Co. Luma Electric Equipment Co.	216
McCabe & Sheeran Mehy. Co.	241
McDonald Machinery Co.	100
McKenna Metals Co.	198
McKenna Metals Co. McMahon Co., Frank M. Machinery Manufacturing Co.	124
Machinery Manufacturing Co.	86
Madison-Kipp Corp.	88
Mail Foot Company	191
Mail Tool Company Marburg Brothers Marr-Galbreath Machinery Co.	223
Marshalltown Mfg. Co.	95
Maxwell Co., F. A.	121
Matal Carbides Corn.	176
Metal Carbides Corp. Michigan Chrome Co. Midwest Tool & Eng. Co. Midwest Tool & Mfg. Co.	182
Midwest Tool & Eng. Co.	160
Midwest Tool & Mfg. Co.	97
Miles Machinery Co.	233
Milliken Machine Co.	212
Madeen Machine Corn	182
Molitor Machinery Co.	222
Molitor Machinery Co. Morey Machinery Co., Inc., 54 Morris Machinery & Co., Inc., 54 Morrison Machiner Products Div., Front C Moser Machine Tool Sales	232
Morris Machinery & Co., Inc.	234
Morrison Machine Products Div. Front C	over
Moser Machine Tool Sales	227
National Metal Congress Exposition	39
Nedeo Company	224
Nedeo Company Nelson Machinery Co. New Britain Tool & Mfg Co.	190
New Britain Tool & Mig Co.	190
New Method Steel Stamps, Inc.	29
Nieholson File Co. Nielsen, Inc., Nielsen Tool & Die Co. Nilson Machine Co., A. H.	167
Melsen, Inc.,	162
Nielsen Tool & Die Co.	100
Name to Bullow Covering Co.	157
Nonsip Fulley Covering Co.	1.49
Norgren Co., Co. A.	236
Nielsen Tool & Die Co. Nilson Machine Co., A. H. Nonslip Palley Covering Co. Norgren Co., C. A. Norton-Broadway Machinery Co. Numberall Stamp & Tool Co.	164
Tumberan Stamp & Tool Cos	
O'Brien Machinery Co.	228
O'Brien Machinery Co. Oliver Instrument Co.	228
O'Brien Machinery Co. Oliver Instrument Co. O'Neil-Irwin Manufacturing Co.	228
O'Brien Machinery Co. Oliver Instrument Co. O'Neil-Irwin Manufacturing Co. Oborne & Sexton Machinery Co.	228
Oliver Instrument Co. O'Neil-Irwin Manufacturing Co. Osborne & Sexton Machinery Co. Ott Machinery Sales, Inc.	228 187 152 227 251
Oliver Instrument Co. O'Neil-Irwin Manufacturing Co. Osborne & Sexton Machinery Co. Ott Machinery Sales, Inc.	228 187 152 227 251
O'Brien Machinery Co. Oliver Instrument Co. O'Neil-Irwin Manufacturing Co. Osborne & Sexton Machinery Co. Ott Machinery Sales, Inc. Owatonus Tool Co.	228 187 152 227 251
Oliver Instrument Co. O'Neil-Irwin Manufacturing Co. Osborne & Sexton Machinery Co. Ott Machinery Sales, Inc.	228 187 152 227 251
Oliver Instrument Co. O'Neil-Iwim Manufacturing Co. Osborne & Sexton Machinery Co. Ott Machinery Sales, Inc. Owatonus Tool Co.	228 187 152 227 254 190
Oliver Instrument Co. O'Neil-Iwim Manufacturing Co. Osborne & Sexton Machinery Co. Ott Machinery Sales, Inc. Owatonus Tool Co.	228 187 152 227 254 190
Oliver Instrument Co. O'Neil-Iwim Manufacturing Co. Osborne & Sexton Machinery Co. Ott Machinery Sales, Inc. Owatonus Tool Co.	228 187 152 227 254 190
Oliver Instrument Co. O'Neil-Iwim Manufacturing Co. Osborne & Sexton Machinery Co. Ott Machinery Sales, Inc. Owatonus Tool Co.	228 187 152 227 254 190
Oliver Instrument Co. O'Neil-Irwim Manufacturing Co. Osborne & Sexton Machinery Co. Ott Machinery Sales, Inc. Owatonus Tool Co.  Passunan Bros. Peters Tool Co. Pier Equipment Co. Plunket Machine Co., J. E.	228 187 152 227 254 190 254 178 207 126
Oliver Instrument Co. O'Neil-Irwim Manufacturing Co. Osborne & Sexton Machinery Co. Ott Machinery Sales, Inc. Owatonna Tool Co.  Passuman Bros. Peters Tool Co. Plunket Machine Co., J. E. Pontel Filing Meh. Co.	228 187 152 227 234 190 254 178 207 126 106

Practi & Whitney Co. Precision Tool Co. Preis Engraving Machine Co., H. P. Printz Electric Co.

TOOL BLUE BOOK OCTOBER 194	U
Procunier Safety Chuck Co.	10
Production Machine Co.	133
Production Machine Co. Progressive Tool & Cutter Co.	163
Putnam Tool Co.	201
Putnam Tool Co. Pyrometer Instrument Co	161
0. 1. 1	100
Quality Hardware & Machine Corp.  Quality Tool & Die Co.	179
R & L Tools	
Racine Tool & Meh. Co.	177
Reeve-Fritts Co.	224
Reeve-Fritts Co. Regar Mehy. & Mill Supply, S. M.	228
	200
Reliance Machinery Sales Co.	221
Remco Froducts Corp.	156
Rigid Tool Holder Co.	102
Ritterbush & Co. Riverside Machinery Depot	230
Rogers & Co., Saml. C. Rosberg Mfg. Co., J. H. Rosenkranz, Weisbecker & Co.	183
Rosberg Mfg, Co., J. H.	192
Rosenkranz, Weisbecker & Co.	224
Rotor Tool Co. Russell Boring Bar Co.	13
Russell Boring Bar Co.	193
Russell Machine Co	544
nyerson & Son, Inc., Jos. 1.	24
S & S Machine Works	120
S. & S. Machinery Co. Safety Socket Screw Corp.	232
Safety Socket Screw Corp.	146
Saroston Company	1.59
Schauer Machine Co.	216
Scherr Co., George	259
Scott Machinery Sales	246
Segal Machinery Co.	253
	147
Severance Tool Mig. Co.	79
Severance Tool M(g. Co. Shaw-Box Crane & Hoist Division	201
Sheldon Machine Co. Siegman Machinery Co. Simmons Machine Tool Corporation 123-	146
Siegman Machinery Co.	221
Simmons Machine Tool Corporation 123-	246
Stre Courtof Co.	213
Skilsaw, Inc.	9
Smith Power Transmission Co.	19
Smith Power Transmission Co. South Bend Lathe Works Stackbin Corporation	22
Stackbin Corporation	181
Stacy, Allan Standard Machinery Co.	221
Standard Pattern Co.	710
Standard Pressed Steel Co	75
Star Machine & Engineering Corp.	136
State Machinery Co.	224
Steege Machinery Co., W. L.	136
	175
Strong, Carlisle & Hammond Co.	244
Sturdimatic Tool Co. Sundstrand Machine Tool Co. Sutton Tool Co.	112
Sundstrand Machine Tool Co.	69
Sutton Tool Co.	137

Tannewitz Works
Taylor Machine Co.
Taylor My Machine Co.
Toledo Pipe Threading Machine Co.
Tomkins-Johnson Co.
Torit Manufacturing Co.
Torq Electric Mig. Co.

204 197 194 165 181 Travers Tool Co.

Trico Fuse Co.

244

226

199

## Index To Advertisers, Con't.

Troyke, Alfred A. Turner Uni-Drive Company	176
U. S. Tool Company	15
Universal Chaincering Lo.	I 4 Mar. 1 254
Universal High Speed Tool Co.	109
Used and Rebuilt Machinery	221-255
Victor Machinery Co.	254
Victor Machinery Exchange	239
Vimco Mig. Co.	110
Vincent Steel Process Co.	104
Wine D A	0.00

Vonnegut Moulder Corporation

Wade Instrument Co. . Wade Tool Co.

Walker-Turner Manufacturing Co.	103
Wall-Colmonov Corp.	139
Walls Sales Corporation	158
Walton Co.	166
Wardwell Mfg. Co.	186
Wayne Chemical Products Co.	200
Wells Manufacturing Co.	92
Western Tool & Mir. Co.	749-178
Western Tool & Stamping Co.	98
Westlof Tool & Die Co.	163
West Penn Machinery Co.	226
White Machinery Co., A. D.	255
White Dental Mfg. Co., S. S.	32
Whitney Metal Tool Co.	191
Wigglesworth Machinery Co.	232
Willey's Carbide Tool Co.	7
Wilson K B	12
Wilson, K. R. Wittek Manufacturing Co.	171
Wolnick Machinery Co., H. F.	224
Wrought Washer Manufacturing Co.	141
w rought washer manufacturing Co.	63
Wyzenbeck & Staff, Inc.	6.3

Zaborn Meh, & Gear Co., J.

Zeeve, Alex

Les Zeh & Hahnemann Co.

198 Ziegler Tool Co., Wm. M.

## FOR QUICK SET-UP IN SURFACE GRINDING USE THE MAGNE-BLOX ANGLE IRON

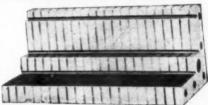
 By placing the MAGNE-BLOX ANGLE IRON on your magnetic chuck you actually have a magnetic right angle which will give you the same holding power per square inch as the chuck itself.

Over-all dimensions are 38x38x71/28. There are six steps measuring 3/168, 3/18, 1/28, 5/18, 15/168, and 15/18 in width.

For grinding straight edge sections, small pieces, four sides of a square, angular work and other applications, the Universal Magne-Blox Angle Iron is indispensable.

### Price \$40.50





## For universal applications.

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This set in combination with the Magne-Blox Angle Iron forms the basis for holding practically any type set-up without clampor attachments. The work can be blocked up on the angle iron with either or both the small parallels and V-blocks.

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Write now for complete literature on all Magne-Blox products.

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### Index To Advertisers, Con't.

muex to Auvertisets, con t.	
Laurens Bros.	23
Lee & Son Co., K. O.	7
Lima Electric Motor Co.	133
Littell Machine Co., F. J.	178
Logan Engineering Co.	19
Loshbough-Jordan Tool & Mch. Co.	120
Lowe Co., Chas. E.	22
Lufkin Kule Co.	211
Laurens Bros. Lee & Son Co., K. O. Lima Electric Motor Co. Littell Machine Co., F. J. Logan Engineering Co. Loshbough-Jordan Tool & Meh. Co. Lowe Co., Chas. E. Lafkin Rule Co. Luma Electric Equipment Co.	210
McCabe & Sheeran Mehy. Co. McDonald Machinery Co. McKenna Metals Co. McKenna Co., Frank M. Machinery Manufacturing Co. Madison-Kipp Corp. Mall Tool Company Marburg Brothers Marr-Galbreath Machinery Co. Maxwell Co., F. A. Metal Carbides Corp. Michigan Chrome Co. Midwest Tool & Eng. Co. Midwest Tool & Mg. Co. Milled Machiner Co. Milled Machiner Co. Milled Machiner Co. Midled Machiner Corp. Molitor Machiner Corp. Molitor Machinery Co., Inc. Morrison Machiner Poducts Div. Front Co. Moser Machiner Tool Sales	233 100 198 124 86 88 191 223 99 121 170 182 212 222 222 222 234 0vet
National Metal Congress Exposition Nedoo Company Nelson Machinery Co. New Hritain Tool & Mig Co. New Method Steel Stamps, Inc. Nichoson File Co. Niclesca, Inc. Niclesca Tool & Die Co. Nilson Machine Co., A. H. Nanslip Pulley Covering Co. Norgren Co., C. A. Norton-Broadway Machinery Co. Numberall Stamp & Tool Co.	39 144 224 190 183 29 167 162 187 157 149 230 164
O'Brien Machinery Co. Oliver Instrument Co. O'Neil-Irwin Manufacturing Co. Osborne & Sexton Machinery Co. Ott Machinery Sales, Inc. Owatonna Tool Co.	228 187 132 227 254 190
Passman Bros. Peters Tool Co. Pier Equipment Co. Plunket Machine Co., J. E. Postel Filing Meh. Co. Pratt & Whitney Co. Precision Tool Co. Preis Engraving Machine Co., H. P. Printz Electric Co.	178 207 126

Procunier Safety Chuck Co.	16
Production Machine Co.	133
Production Machine Co. Progressive Tool & Cutter Co.	162
Putnam Tool Co.	208
Pyrometer Instrument Co.	168
Quality Hardware & Machine Corp.	108 179
R & L Tools Racine Tool & Mch. Co.	8
Racine Tool & Mch. Co.	177
Reeve-Fritts Co.	224
Regar Mehy, & Mill Supply, S. M.	228
Reich Manufacturing Co., J. R. Reliance Machinery Sales Co.	200
Remco Products Corp.	136
Rigid Tool Holder Co.	102
Ritterbush & Co.	
Riverside Machinery Depot	230
Hogers & Co., Saml, C.	183
Rosberg Mfg. Co., J. H. Rosenkranz, Weisbecker & Co.	192
Rosenkranz, Weisbecker & Co.	224
Ross Co., David J.	115
Rotor Tool Co. Russell Boring Bar Co.	13 '
Russell Machine Co.	193
Russell Machine Co. Ryerson & Son, Inc., Jos. T.	222
Acceptable Court and Joseph Et	4.4
S & S Machine Works	190
S & S Machine Works S, & S. Machinery Co.	120 232
Safety Socket Screw Corn.	232
Safety Socket Screw Corp.	232
Safety Socket Screw Corp. Saroston Company Schauer Machine Co.	232
S. & S. Machinery Co. Safety Socket Seriew Corp. Saroston Company Schauer Machine Co. Seherr Co., George	232 146 159
S. & S. Machinery Co. Safety Socket Screw Corp. Saroston Company Schauer Machine Co. Scherr Co., George Scott Machiners Sale.	232 146 159 216 259 246
S. & S. Machinery Co. Safety Socket Series Corp. Saroston Company Schauer Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Co.	232 146 159 216 259 246 253
S. & S. Machinery Co. Safety Socket Series Corp. Saroston Company Schauer Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Co.	232 146 159 216 259 246 253 147
S. & S. Machinery Co. Safety Socket Series Corp. Saroston Company Schauce Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Go. Sellers & Co., & m. Songer Falls Machine Co.	232 146 159 216 259 246 253 147 122
S. & S. Machinery Co. Safety Socket Series Corp. Saroston Company Schauce Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Go. Sellers & Co., & m. Songer Falls Machine Co.	232 146 159 216 259 246 253 147 122 79
S. & S. Machinery Co. Safety Socket Series Corp. Saroston Company Schauer Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Co. Sellers & Co., Win. Sencea Falls Machine Co. Severance Tool Mig. Co. Shaw-Box Crane & Hoist Division Sheldon Machine Co.	232 146 159 216 259 246 253 147 122 79 201
S. & S. Machinery Co. Safety Socket Series Corp. Saroston Company Schauer Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Co. Sellers & Co., Win. Sencea Falls Machine Co. Severance Tool Mig. Co. Shaw-Box Crane & Hoist Division Sheldon Machine Co.	232 146 159 216 259 246 253 147 122 79 201
S. & S. Machinery Co. Safety Socket Series Corp. Saroston Company Schauer Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Go. Sellers & Co., Win. Seneca Falls Machine Co. Severance Tool Mig. Co. Shaw-Box Crane & Hoist Division Sheldon Machine Co. Sigman Machine Co. Sigman Machine Co. Sigman Machine Co.	232 146 159 216 259 246 253 147 122 79 201
S. & S. Machinery Co. Safety Socket Series Corp. Saroston Company Schauer Machine Co. Scherr Co., George Segal Machinery Sales Segal Machinery Co. Sellers & Co., Win. Seneca Falls Machine Co. Severance Tool Mig. Co. Severance Tool Mig. Co. Severance Tool Mig. Co. Simmon Machiner Co. Siegman Machiner Co. Sigmon Machiner Co. Simmons Machiner Tool Corporation 123- Size Control Co.	232 146 159 216 259 246 253 147 122 79 201 146 221 246 213
S. & S. Machinery Co. Safety Socket Series Corp. Saroston Company Schauer Machine Co. Scherr Co., George Segal Machinery Sales Segal Machinery Co. Sellers & Co., Win. Seneca Falls Machine Co. Severance Tool Mig. Co. Severance Tool Mig. Co. Severance Tool Mig. Co. Simmon Machiner Co. Siegman Machiner Co. Sigmon Machiner Co. Simmons Machiner Tool Corporation 123- Size Control Co.	232 146 159 216 259 246 253 147 122 79 201 146 221 246 213
S. & S. Machinery Co. Saroston Company Saroston Company Schauer Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Co. Sellers & Co., Win. Seneca Falls Machine Co. Severance Tool Mig. Co. Severance Tool Mig. Co. Severance Tool Mig. Co. Simmons Machiner Co. Siegman Machiner Co. Sigmons Machiner Co. Sigmons Machiner Tool Corporation 123- Ski Saw, Inc. Ski Saw, Inc.	232 146 159 216 259 246 253 147 122 79 201 146 221 246 213
S. & S. Machinery Co. Saroston Company Saroston Company Schauer Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Go. Sellers & Co., Win. Seneca Falls Machine Co. Severance Tool Mig. Co. Shaw-Box Crane & Hoist Division Sheldon Machinery Co. Sigmon Machinery Co. Sigmon Machine Co. South Boat Line Machine Co. South Boat Line Machine Co. South Beat Line Machine Co. Smith Power Transmission Co. South Beat Lathe Works	232 146 159 216 259 246 253 147 122 79 201 146 221 246 213 9
S. & S. Machinery Co. Sarots Nocket Series Corp. Sarots Octopany Schauer Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Go. Seliers & Co., Win. Seneca Falls Machine Co. Severance Tool Mig. Co. Shaw-Box Crane & Hoist Division Sheldon Machine Co. Siegman Machine Co. Siegman Machine Tool Simmons Machine	232 146 159 216 259 246 253 147 122 79 201 146 221 246 213 9 19 19 22 181
S. & S. Machinery Co. Sarots Nocket Series Corp. Sarots Octopany Schauer Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Go. Seliers & Co., Win. Seneca Falls Machine Co. Severance Tool Mig. Co. Shaw-Box Crane & Hoist Division Sheldon Machine Co. Siegman Machine Co. Siegman Machine Tool Simmons Machine	232 146 159 216 259 246 253 147 122 79 201 146 221 246 213 9 19 221
S. & S. Machinery Co. Saroston Company Saroston Company Schauer Machine Co. Schauer Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Go. Sellers & Co., Wim. Seneca Falls Machine Co. Severance Tool Mig. Co. Shaw-Box Crane & Hoist Division Sheldon Machine Co. Siegman Machinery Co. Siegman Machine Tool Corporation 123- Size Control Co. Simbor Sales Control Co. Smith Power Transmission Co. South Bend Lathe Works Stackbin Corporation Standard Machinery Co.	232 146 159 216 259 246 253 147 122 201 146 221, 246 213 19 22 181 22 1
S. & S. Machinery Co. Safety Socket Series Corp. Saroston Company Schauer Machine Co. Scherr Co., George Scott Machinery Co. Sellers & Co., & m. Seneca Falls Machine Co. Severance Tool Mig. Co. Shaw-Box Crane & Hoist Division Sheldon Machine Co. Sigmon Machiner Co. Sigmon Machiner Co. Sigmon Machiner Co. Sigmon Machiner Co. Simmons Machiner Tool Corporation 123- Size Control Co. Sailsaw, Inc. Smith Power Transmission Co. South Bend Lathe Works Stackbin Corporation Stacy, Allan Standard Pattern Co. Standard Machinery Co.	232 146 159 216 259 246 253 147 122 79 201 146 221, 246 213 9 19 122 181 227 221
S. & S. Machinery Co. Saroston Company Saroston Company Schauer Machine Co. Schauer Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Go. Sellers & Co., Win. Seneca Falls Machine Co. Severance Tool Mig. Co. Shaw-Box Crane & Hoist Division Sheldon Machine Co. Siegonan Machinery Co. Siegonan Machinery Co. Siegonan Machine Co. Siegonan Machine Co. Siegonan Machine Co. Siegonan Machine Co. South Box Control Co. Shilsaw, Inc. Smith Power Transmission Co. South Bend Lathe Works Stackbin Corporation Stay, Allan Standard Machinery Co. Standard Pattern Co.	232 146 159 216 259 246 253 147 122 79 201 146 221 221 221 221 221 221 221 221 221 22
S. & S. Machinery Co. Saroston Company Saroston Company Schauer Machine Co. Schauer Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Go. Sellers & Co., Win. Seneca Falls Machine Co. Severance Tool Mig. Co. Shaw-Box Crane & Hoist Division Sheldon Machine Co. Siegonan Machinery Co. Siegonan Machinery Co. Siegonan Machine Co. Siegonan Machine Co. Siegonan Machine Co. Siegonan Machine Co. South Box Control Co. Shilsaw, Inc. Smith Power Transmission Co. South Bend Lathe Works Stackbin Corporation Stay, Allan Standard Machinery Co. Standard Pattern Co.	232 146 159 246 259 246 253 147 122 79 201 146 221 246 221 246 221 221 221 221 321 336
S. & S. Machinery Co. Saroston Company Saroston Company Schauer Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Go. Sellers & Co., Win. Seneca Falls Machine Co. Severance Tool Mig. Co. Shaw-Box Crane & Hoist Division Sheldon Machine Co. Sigman Machine Co. Sigman Machine Fool Corporation Size Control Co. Size Control Co. Size Machine Co. Smith Power Transmission Co. South Bend Lathe Works Stackbin Corporation Stacy, Allan Standard Machinery Co. Standard Pattern Co. Standard Pattern Co. Standard Pattern Co. Standard Pattern Co. Star Machinery Go. Star Machinery Go. Star Machinery Go. Stare Machinery Go. Steege Machinery Co. Steep Machinery Co.	232 146 159 246 259 247 147 122 7201 146 221 246 213 9 19 22 181 227 225 212 74 1225 225 225 225 225 225 225 225 225 22
S. & S. Machinery Co. Safety Socket Series Corp. Saroston Company Schauer Machine Co. Schauer Machine Co. Scherr Co., George Segal Machinery Go. Seliers & Co., Win. Series Co. Singman Machine Co. Singman Machinery Co. Starkin Corporation Stackin Corporation Stackin Corporation Starkin Corporation Standard Machinery Co. Standard Machinery Co. Standard Pattern Co. Standard Machinery Co. Star Machinery Co. Steeling Tool Products Co. Steeling Tool Products Co.	232 146 159 246 259 246 253 147 122 79 201 146 221 246 221 246 221 221 221 221 321 336
S. & S. Machinery Co. Saroston Company Saroston Company Schauer Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Go. Sellers & Co., Win. Seneca Falls Machine Co. Severance Tool Mig. Co. Shaw-Box Crane & Hoist Division Sheldon Machine Co. Sizeman Machine Co. Sizeman Machine Tool Corporation Size Control Co. Sizeman Machine Tool Corporation 123- Size Control Co. Sizeman Machine Co. Smith Power Transmission Co. South Bend Lathe Works Stackbin Corporation Stacy, Allan Standard Machinery Co. Standard Pattern Co. Standard Pattern Co. Standard Pattern Co. Star Machinery Co. Star Machinery Co. Star Machinery Co. Steege Machinery Co. Steegel Machinery Co. Steeling Tool Products Co.	232 146 259 216 253 147 122 201 201 213 221 246 223 3 147 221 246 221 221 221 221 221 221 221 221 221 22
S. & S. Machinery Co. Saroston Company Saroston Company Schauer Machine Co. Scherr Co., George Scott Machinery Sales Segal Machinery Go. Sellers & Co., Win. Seneca Falls Machine Co. Severance Tool Mig. Co. Shaw-Box Crane & Hoist Division Sheldon Machine Co. Sizeman Machine Co. Sizeman Machine Tool Corporation Size Control Co. Sizeman Machine Tool Corporation 123- Size Control Co. Sizeman Machine Co. Smith Power Transmission Co. South Bend Lathe Works Stackbin Corporation Stacy, Allan Standard Machinery Co. Standard Pattern Co. Standard Pattern Co. Standard Pattern Co. Star Machinery Co. Star Machinery Co. Star Machinery Co. Steege Machinery Co. Steegel Machinery Co. Steeling Tool Products Co.	232 146 259 216 253 147 122 201 146 223 19 221 246 213 19 221 221 221 221 221 221 221 221 221
S. & S. Machinery Co. Safety Socket Series Corp. Saroston Company Schauer Machine Co. Scherr Co., George Segal Machinery Go. Sellers & Co., & m. Seneca Falls Machine Co. Severance Tool Mig. Co. Shaw-Box Crane & Hoist Division Sheldon Machine Co. Sigmon Machiner Co. Sigmon Machiner Co. Sigmon Machiner Tool Corporation 123- Size Control Co. Sailsaw, Inc. Smith Power Transmission Co. South Bend Lathe Works Stackbin Corporation Stacky Allan Stackbin Corporation Stacky Allan Standard Pattern Co. Standard Pattern Co. Standard Machinery Co. Standard Pattern Co. Sterling Tool Products Co. Sterling Tool Products Co. Strong, Carliele & Hammond Co. Stundinatic Tool Co. Stundinatic Tool Co.	232 146 259 216 259 246 253 147 201 142 201 221 246 221 221 32 147 221 32 148 122 136 221 32 147 32 147 32 147 32 32 44 32 32 32 32 32 32 32 32 32 32 32 32 32
S. & S. Machinery Co. Safety Socket Series Corp. Saroston Company Schauer Machine Co. Scherr Co., George Segal Machinery Go. Sellers & Co., & m. Seneca Falls Machine Co. Severance Tool Mig. Co. Shaw-Box Crane & Hoist Division Sheldon Machine Co. Sigmon Machiner Co. Sigmon Machiner Co. Sigmon Machiner Tool Corporation 123- Size Control Co. Sailsaw, Inc. Smith Power Transmission Co. South Bend Lathe Works Stackbin Corporation Stacky Allan Stackbin Corporation Stacky Allan Standard Pattern Co. Standard Pattern Co. Standard Machinery Co. Standard Pattern Co. Sterling Tool Products Co. Sterling Tool Products Co. Strong, Carliele & Hammond Co. Stundinatic Tool Co. Stundinatic Tool Co.	232 146 259 216 253 147 122 201 146 223 19 221 246 213 19 221 221 221 221 221 221 221 221 221

Tannewitz Works
Taylor Machine Co.
Toledo Pipe Threading Machine Co.
Tomkins-Johnson Co.
Torit Manufacturing Co.
Torit Electric Mfg. Co.

181

## Index To Advertisers, Con't.

Travers Tool Co.	244
Trico Fuse Co.	164
Troyke, Alfred A.	176
Turner Uni-Drive Company	iii
U. S. Tool Company Universal Engineering Co.	15
Universal Engineering Co.	106-189
Universal High Speed Tool Co. Used and Rebuilt Machinery	109
Used and Rebuilt Machinery	221-255
Victor Machinery Co. Victor Machinery Exchange Vincen Mg. Co. Vincent Steel Process Co. Vine, R. A. Vonnegut Moulder Corporation	239 110 104 255
Wade Instrument Co.	165

Walker-Turner Manufacturing Co.	105
Wall-Colmonoy Corp.	139
Walls Sales Corporation	158
Walton Co.	101
Wardwell Mfg. Co.	180
Wayne Chemical Products Co.	200
Wells Manufacturing Co.	92
Western Tool & Mfg. Co. 70	-178
Western Tool & Stamping Co.	98
Westlof Tool & Die Co.	1.63
West Penn Machinery Co.	226
White Machinery Co., A. D.	255
White Dental Mfg. Co., S. S.	32
Whitney Metal Tool Co.	191
Wigglesworth Machinery Co.	232
Willey's Carbide Tool Co.	6
Wilson, K. R.	12
Wittek Manufacturing Co.	171
Wolnick Machinery Co., H. F.	224
Wrought Washer Manufacturing Co.	141
Wyzenbeek & Staff, Inc.	63
Zabora Meh. & Gear Co., J.	160
Zeeve, Alex	226
Zeh & Hahnemann Co.	168
Zingles Tool Co. Wm. M	1400

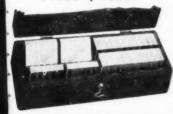
## FOR QUICK SET-UP IN SURFACE GRINDING USE THE MAGNE-BLOX ANGLE IRON

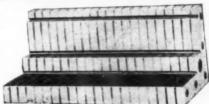
By placing the MAGNE-BLOX ANGLE IRON on your magnetic cluek you actually have a magnetic right angle which will give you the same holding power per square inch as the chuck itself.

Over-all dimensions are 3"x3"x71/2". There are six steps measuring 3/16", 3/4", 1/2", 3/4", 15/16", and 15/16" in width.

For grinding straight edge sections, small pieces, four sides of a square, angular work and other applications, the Universal Magne-Blox Angle Iron is indispensable.

### Price \$40.50





## For universal applications.

The Small UNIVERSAL MAGNE-BLOX setconsists of two parallels measuring 1\*x13/4\*x33/4\* and two V-blocks measuring 13/4\*x 23/4\*x13/4\*, complete in hardwood case.

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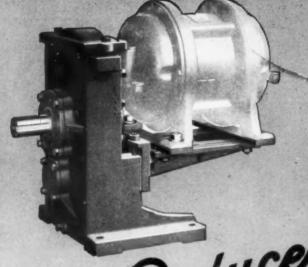
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Compact, powerful money-saving production unit. Replaces cumbersome costly machines that are expensive to operate. Uses same dies as larger machines.



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The only press brake which turns out perfect work without shims and crowned dies. Patented non-deflecting bed equalizes pressure over the full bending length and over-comes major faum in solid bed press brakes.



seed Reducers

ANY MOTOR can be used with the Cullman Speed Reducer. mounting has a universal adjustment which permits application of any make of motor and simplifies installation.

The driver mechanism is simple and sturdy, comprising roller chain and sprockets, Timken roller bearings and helical gears, all operating in oil, in an oil and dust-proof case.

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